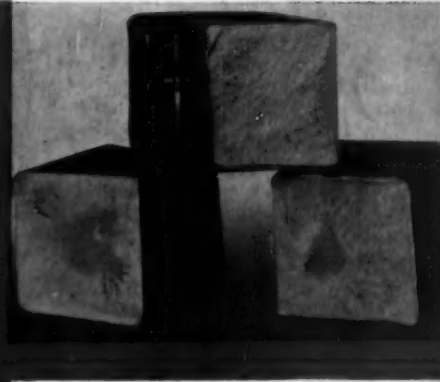
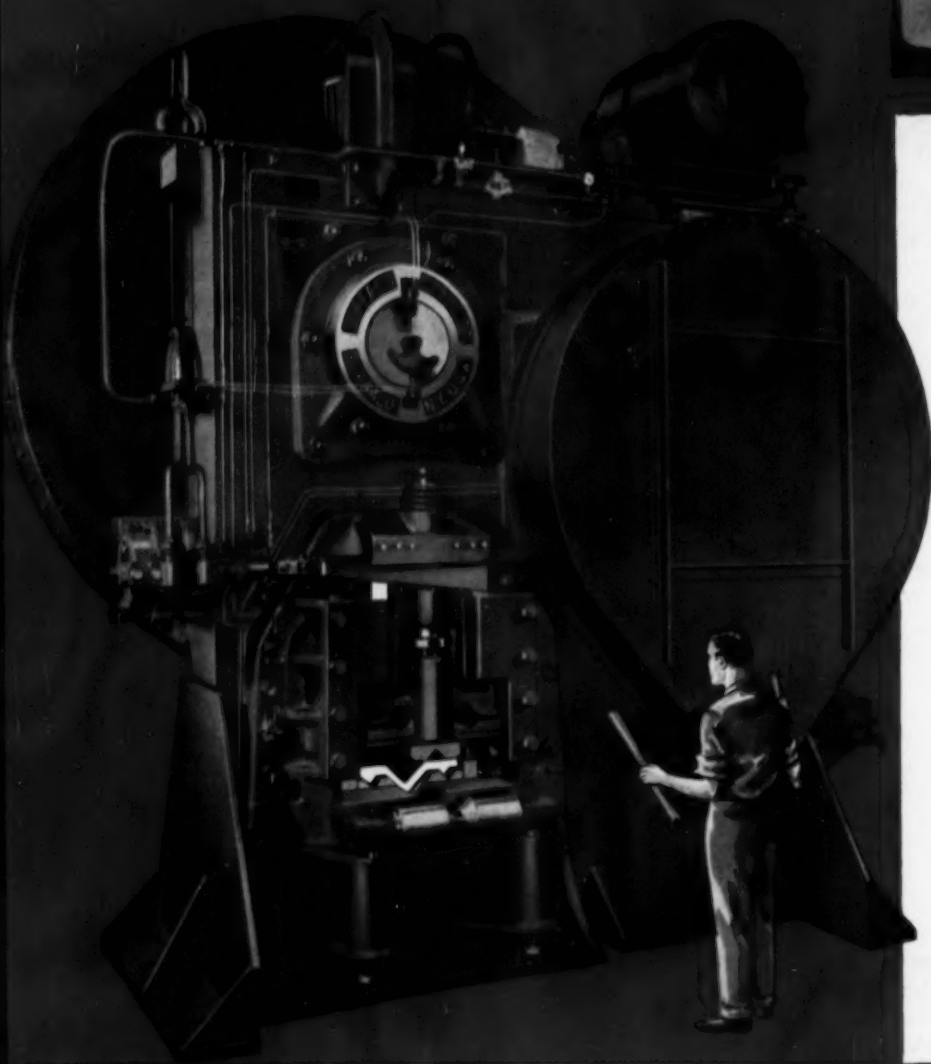


The **Iron Age** A Chilton Publication

**Vacuum cast
150 ton
forging ingots**
See page 91

THE NATIONAL METALWORKING WEEKLY • FEBRUARY 17, 1955

CUTS LIKE THESE MEAN BETTER FORGINGS

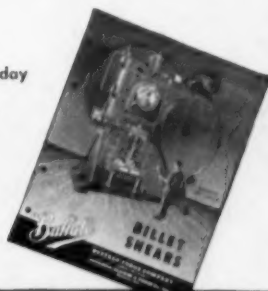


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Clean, square end shearing of billets to uniform multiple blanks represents the first step in good forging practice. The second important factor is quantity production. The speed of billet shearing tops all other methods. The shear that does all this and more is the "Buffalo". It gives you higher speeds, plus the latest improvements in heavy construction and accessories, typical of the "Q" Factor* in all "Buffalo" products. 11 sizes for handling up to 10" rounds or 9" squares.

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BUFFALO, N. Y.



THE KING'S ARMOURER

Most skillful of all the metal workers was the King's Armourer, sketched by our artist from an old steel engraving. With all the cunning of his craft, the armourer selected finest steels and fashioned breastplate and helmet for his liege, fitted them to his royal person, and kept them always bright and shining and in perfect repair.



Crafts and craftsmen through the ages

NUMBER ONE OF A SERIES

Today, too few manufacturers in addition to selling their products see to it that they also fit customer needs exactly and deliver the greatest possible benefits. Basic not only manufactures quality refractories for the construction, maintenance and repair of open hearth and electric steelmaking furnaces, but employs skilled engineering personnel to insure that the use of these products gives full value.

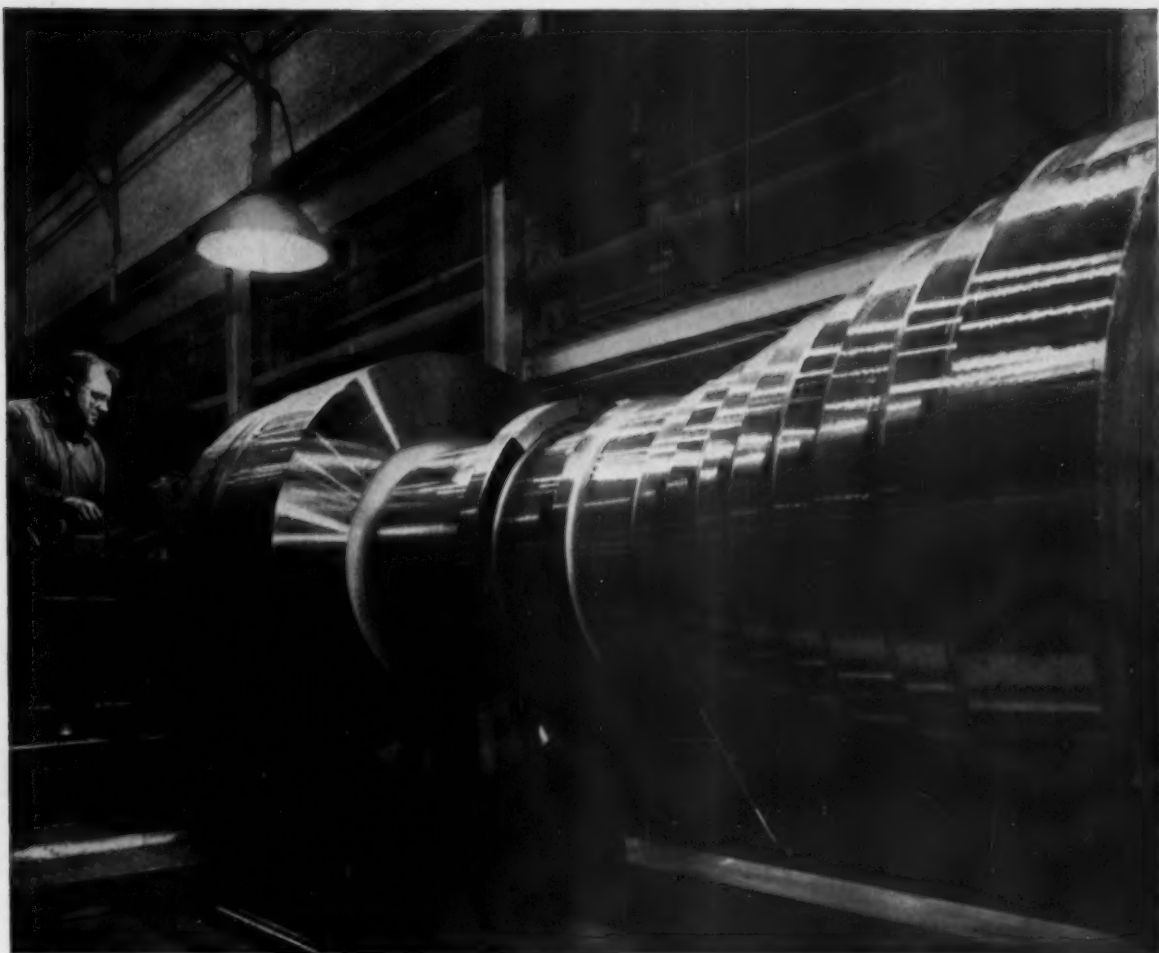
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REFRACTORIES ENGINEERING AND SUPPLIES LTD.—EXCLUSIVE CANADIAN AGENTS

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REFRACTORIES



21-Ton Forging Becomes Spindle for Steam Turbine

This big forging, made of chromium-molybdenum-vanadium steel, weighs approximately 43,000 lb—over 21 tons. It was upset and solid-forged from an ingot, then rough-turned, block-bit-bored, and heat-indicated for stability. At the machining stage shown here, the forging is 18 ft 8½ in. long and has various diameters ranging from 14½ to 52½ in.

It is in the process of becoming a spindle for a large steam turbine—one of many such pieces that Bethlehem has made through the years. You could call it a typical example of Bethlehem heavy forgings, though

it by no means represents the top limits of our shop capacity. Some of our giant-size forgings have exceeded 100 tons with plenty to spare.

Down at the other end of the line, we make drop forgings weighing as little as one pound. And in between the two extremes you will find about every size, type, and weight of forging that is ever called for—including some unusual items that might never occur to you. Example: tapered-end forged-and-bored pieces for high-

temperature, high-pressure service in central stations and oil refineries.

No matter what kind of forgings you require—large, medium, or small—Bethlehem can make them for you. Call us when you're in the market! A job done in the Bethlehem shops is one you can depend upon.

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BETHLEHEM STEEL



Starred items are digested at the right

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Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

AFL-CIO MERGER IS VICTORY FOR McDONALD — P. 53

Joining of two unions is along lines proposed by United Steelworkers' David McDonald. Autoworker's Reuther was cool on the merger plan. New union will have about 15 million members and will carry more weight in Washington. Change will not have any effect on steel labor relations.

ROOM FOR MORE URANIUM PROCESSORS — P. 54

Uranium ore output still exceeds processing capacity. But there are still plenty of pitfalls awaiting any prospective new members of the industry. AEC guarantees the market and helps with tax breaks. Commercial nuclear power is a future booster for the market.

MANY DETROIT AUTO PLANTS GATHER DUST — P. 57

Changing automotive economics have idled millions of square feet of Motor City facilities. Obsolescence, lack of business, mergers, decentralization are factors. Cite case histories.

ENGINEER SUPPLY-DEMAND GAP WIDENS — P. 59

Civilian industry alone needs 35,000 new engineers every year—but the nation's universities graduated only 20,000 last year. In contrast, Russia gained 54,000 graduate engineers in 1954. One problem is most efficient use of the technical men we have. Another is selling scientific careers to youth.

WHAT THE KREMLIN SHIFT MEANS TO YOU — P. 65

You can figure the Malenkov fadeout won't have much effect on U. S. defense spending nor on business activity. What the shift does mean is this: (1) "Peaceful coexistence" will be dropped, (2) Red China will be tougher than ever, and (3) Moscow's internal dissension won't slow the Reds' international adventures. New Moscow brass, particularly Zhukov and Khrushchev, are regarded as "Red China Firsters."

GM TESTS CARS WITH HIGH-SPEED CAMERA — P. 68

GM calls it a "time microscope." And that best describes the use of ultra-fast cameras to see what happens in operation of parts moving too fast to see with the eye. When viewing at a normal 32 frames per second pictures which were taken at 15,000, you can spot flaws in such things as valve operation.

ENGINEERING & PRODUCTION

VACUUM CAST 150-TON FORGING INGOTS — P. 91

Forging ingots weighing up to 150 tons, and virtually hydrogen free, are being vacuum cast commercially in Germany by what is essentially a low-pressure degassing method. Metallurgical quality has improved substantially and manufacturing costs reduced sharply. Extensive slow cooling periods and lengthy heat treatments have been largely eliminated.

CARBONITRIDING SETUP AIDS UNIFORMITY — P. 95

By integrating an atmosphere hardening furnace with an automatic quench, wash and draw, high quality, uniformity and safety have been achieved on steering gear components. Once parts enter the hardening furnace, they must pass through the draw furnace before they can be removed from the heat-treating setup. Thus, no brittle parts can escape to the finishing department.

STUD DRIVING MACHINE ELIMINATES TAPPING — P. 98

Studs can be driven into diecastings at rates up to 20 pieces per minute on a recently developed multiple-spindle, stud driving-tapping machine. All spindles operate simultaneously. An automatic chuck prevents damage to threads. Holes can be at compound angles.

PERMANENT MAGNETS AID PIPE HANDLING — P. 100

Faster pickup and more positive movement of pipe on conveyor lines is achieved through the use of permanent magnets. Classification of steel products during manufacture and inspection is also simplified.

NEW WAYS TO PREVENT GALLING, SEIZING — P. 104

Better ways of protecting metals in contact from galling and seizing may result from recent basic research studies. Characteristics of bearing surface films and the selection of bearing metals play an important role in their resistance to galling and seizing.

MARKETS & PRICES

PLANNED PIPELINES WILL BOOM PLATE — P. 51

Insatiable demand for oil and gas will help keep steel order books filled for years. Planned pipeline requirements should mean 1.5 million ton per year demand for electricweld pipe alone over the next 5 years, it is estimated. The 2240-mile Trans-Canadian and the 2600-mile Canada-California pipelines are whoppers scheduled to get underway this spring.

NEW ALLOY STEELS LOOK GOOD ON MARKET — P. 55

A new line of alloy steels showing excellent physical and corrosion properties is being marketed by Uniworld Research Corp. They're called SR, short for Super Rustfree. They compare well with other alloys containing higher percentages of alloy elements.

INVENTORY BUILDUP IS SLOW IN STEEL — P. 139

Consumers are trying to build up their steel inventories but there is little chance of success. Demand for manufactured items is so strong that steel customers are using all the steel coming to them. That means steel stocks in the hands of users are relatively smaller than they were 2 months ago in view of the bulge in industrial activity.

WAREHOUSES WILL FEEL UPSURGE IN MARCH—P. 140

Booming steel demand hasn't reached warehouse level yet, but improvement is felt and all signs point to a real demand upsurge in March. The railroads are beginning to come back into the market.

ZINC STOCKS DROP ANOTHER 7000 TONS — P. 146

Continued heavy stockpile buying slashed another 7000 tons from smelter stocks of slab zinc in January. Consumer shipments dropped 4000 tons but government total rose nearly 2500. Production of 86,106 tons was a new alltime record for monthly output. December aluminum mill shipments up.

NEXT WEEK:

NICKEL-BASE BRAZING ALLOYS GIVE STRONG JOINTS

Good mechanical properties and resistance to corrosion and oxidation are among the chief features of a new series of high-nickel brazing alloys. By alloying with the base material, they form an exceptionally strong bond. Most metals with melting points above 1850°F can be brazed successfully with them. The alloys are made in powder, wire, rod, strip and washer forms.

TINPLATE PRODUCERS EYE THEIR CAPACITY

Steelmen are pondering the advisability of boosting electrolytic tinplate capacity. They set a record in '54 despite steel dip and may surpass it this year. Market is gaining as more things are put in cans and gaining population compounds the boost in demand. But possible threats to Far Eastern supply, attempts to find tin alternates, cloud the picture.



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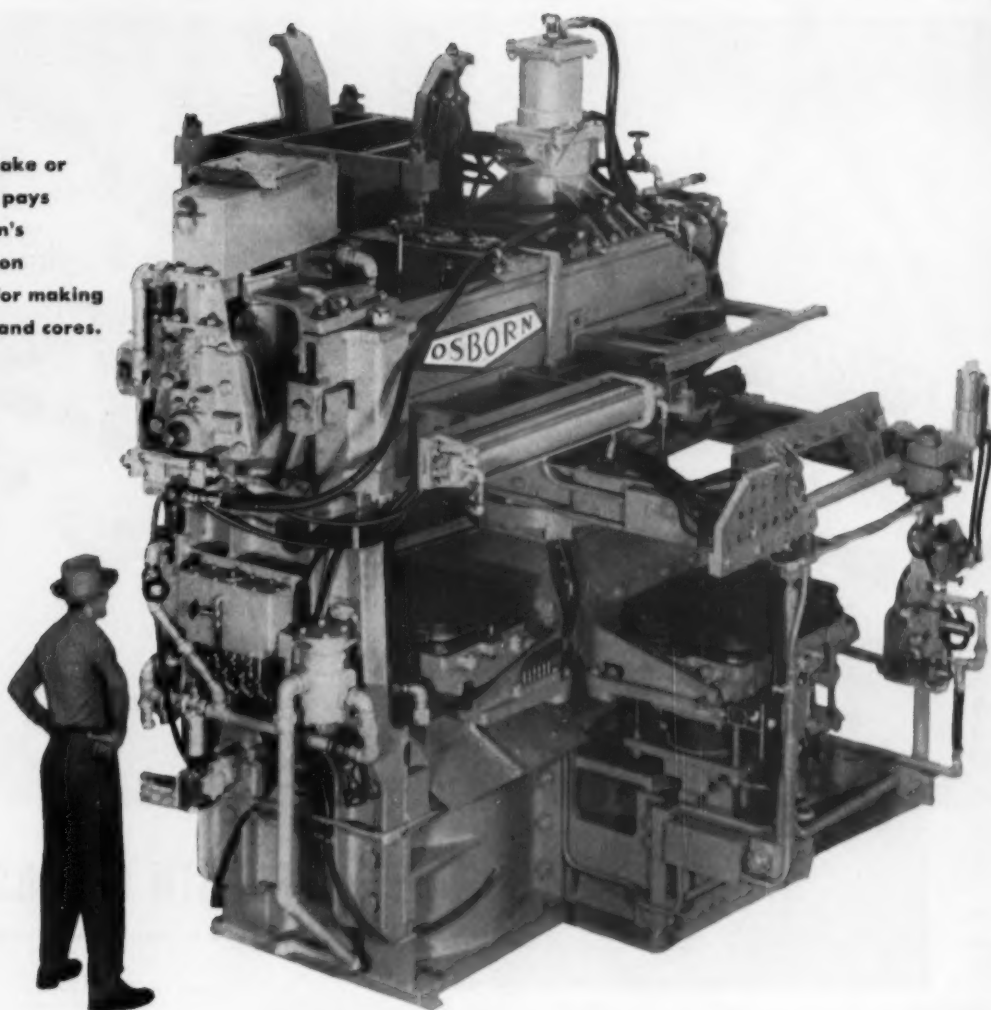
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latest automation
developments for making
foundry molds and cores.



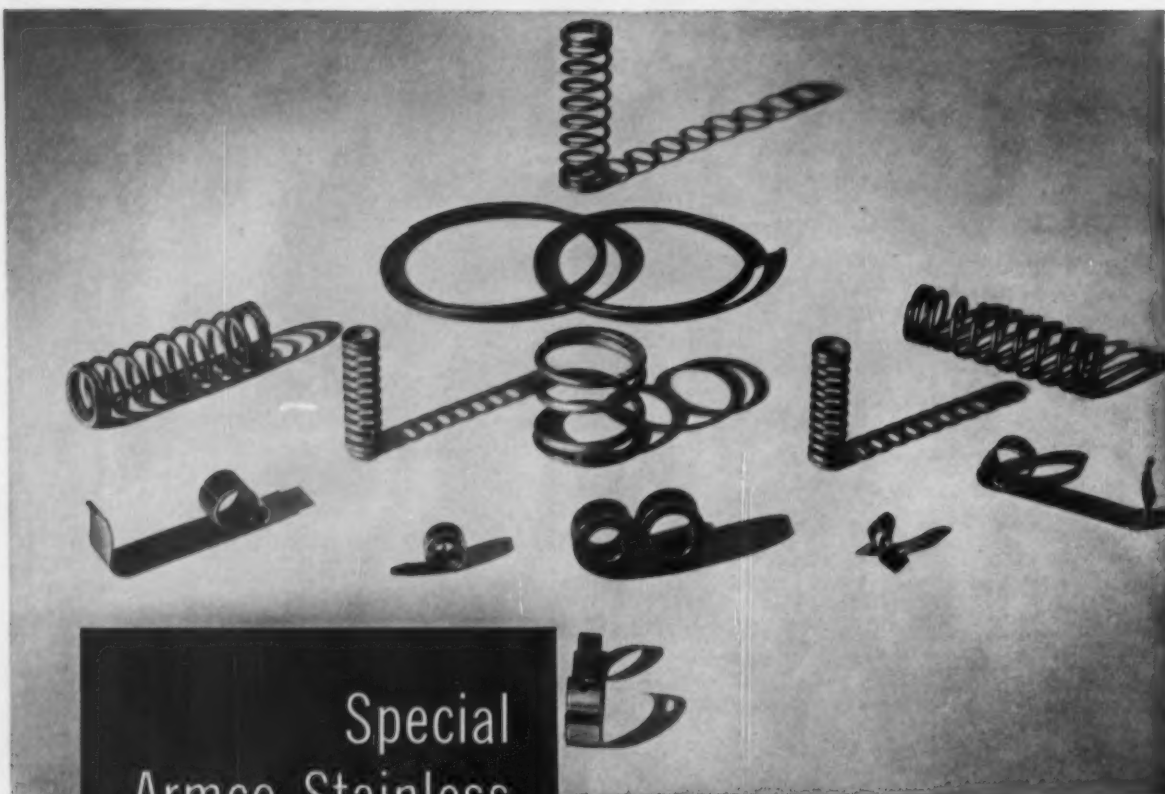
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A special Armco Stainless Steel, known as 17-7 PH, has proved far superior to 18-8 as a spring material. It is also better than non-ferrous spring wire in applications where higher strength is needed. Here are some of the characteristics of this grade of stainless steel.

High Load Capacity

Mechanical properties and modulus of elasticity of Armco 17-7 PH Stainless Steel wire are generally comparable to music wire. This means that the same spring capacity can be obtained in a corrosion and heat resistant spring as in a carbon steel spring, without increase in size.

High Elastic Limit

Armco 17-7 PH springs have a wide deflection range in which they are safe from permanent distortion. This is because of the high torsional elastic limit of the wire — 55 per cent of the ultimate tensile strength.

Better at Elevated Temperatures

Relaxation of helical compression springs of Armco 17-7 PH at temperatures up to 650 degrees F is considerably less than for 18-8 or music wire.

Torsional modulus of 11,000,000 psi is less affected at temperatures up to 650 degrees F than 18-8 or music wire.

Dimensional Stability

After fabrication, only a single heat treatment at 900 degrees F is required to develop full mechanical properties and this treatment stress-relieves as well. Spring dimensions are not affected by this hardening treatment because of the high dimensional stability of Armco 17-7 PH.

Armco 17-7 PH is supplied for coil or flat springs, in bars, sheets, strip and plates. A companion precipitation-hardening grade, Armco 17-4 PH, is supplied in bars.

For further information, write us at the address below.

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and the Engineering Index.



Editorial:

You and the Russian Changes

IT is good for the American people that Khrushchev, the current power figure in Russia, pulled the strings on Malenkov when he did. There are various expert opinions on what the recent Russian changes mean to us. But more important is that the changes in themselves reawaken our mistrust of the Reds and (we hope) put our guard up where it belongs.

Malenkov will probably not be purged or executed. Apparently he never was too strong a figure and is not a threat to the real Red bosses.

Russia will now take a harder line against the Free World. It is fortunate for us that this change in surface tactics has come about. It should stop all trucking with the phrase "peaceful coexistence." It should prove once and for all to millions of Americans that we are not dealing with people of our own kind when we deal with the Russians or the Red Chinese.

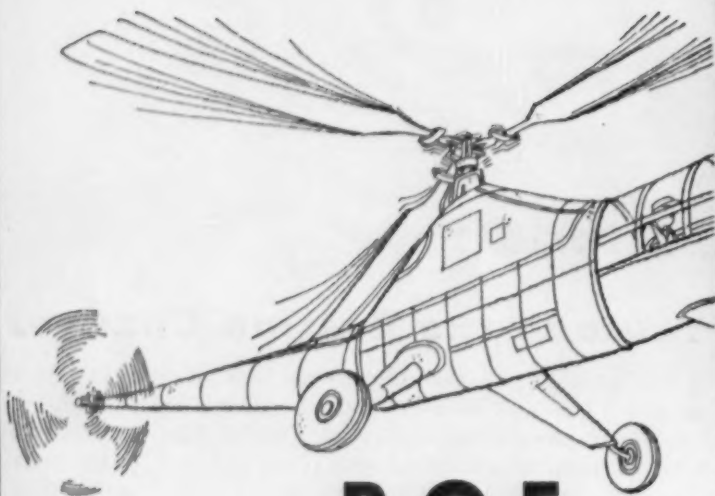
With the Russian military leader Zhukov now in charge of defense it is clear that the Reds are going full steam ahead with their war machine. This means research and expansion in all types of modern weapons at the expense of butter for the people. This should be a stern warning to our own defense people that we can only remain strong enough to resist Red aggression if we keep ahead of the Reds in modern weapons, in modern aircraft and in nuclear advances.

Most press reports have used a lot of space playing up the idea that the military is in control or is the major factor in the Russian duel for power. There is no question that a powerful dictator in Russia must have the support of the military. It is reasonable to believe that Khrushchev has this and that he is well on his way to being top man in Russia. But it is more realistic to believe that the Communist Party rules Russia and supersedes both the military and the "government."

We are right back where we started: the Reds are out to conquer the world. The only way we can prevent this is to remain strong and not to be misled by soft talk which unconsciously affects not only our people but our diplomats and politicians as well.

Tom Campbell

EDITOR



B.O.F.

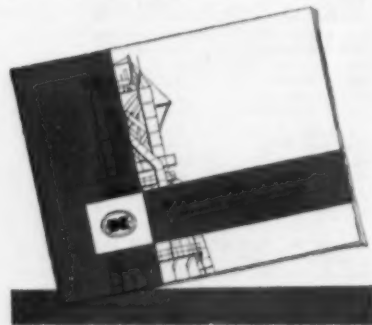
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dear editor:

Government Business

Sir:

It seems to me that you have rendered a very fine service in preparing your pamphlet entitled, "How To Do Business With The Government." (Jan. 6, pp. 225-232). A. S. Flemming, Director, Office of Defense Mobilization, Executive Office of the President, Washington 25, D. C.

Machine Design

Sir:

You seem the most reliable source of information which I need.

I have designed a machine that I would like to sell to Army Ordnance. I wonder if you can tell me who to contact to bring this machine to their attention. J. L. Frazier, Wichita, Kansas.

Army Ordnance Corps maintains a system for examining designs of new equipment which may meet a military need at its Washington headquarters. Please address your material to the Chief of Ordnance, Dept. of the Army, Washington 25, D. C.—Ed.

Micromerograph

Sir:

On p. 206 of your Jan. 6 issue, you refer to the Micromerograph as a new device to determine particle size distribution for particles ranging from 1 to 250 microns. Will you kindly advise us where we might get complete information about it? E. J. Schneider, Engis Equipment Co., Chicago.

The Micromerograph was developed by The Sharples Corp., Bridgeport, Pa. Mr. Phillip P. Sharples, President, is the person to contact. Also, the Sept. 2 issue of The Iron Age carried a complete technical article about this device.—Ed.

Electrostatic Painting

Sir:

May I have your permission to quote excerpts from an article entitled "Get More Coverage With Electrostatic Painting" which ap-

letters from readers

peared in the Aug. 7, 1952 issue of your publication?

The excerpts would be used in a thesis on electrostatic painting methods which I am currently writing in order to obtain a Bachelor of Mechanical Engineering degree. G. R. Squibb, Chief Project Engineer, Process Development Section, General Motors Corp., Detroit.

Automotive Crankshaft

Sir:

In your Dec. 2 issue, the section called Newsfront, there is a short article that reads as follows: "A hollow automotive crankshaft, reported superior in some respects to ordinary forged shafts, will be made in Europe from ductile iron. The new and radical design is being promoted by German designers. Several 1955 sports models are expected to use the ductile iron hollow crankshafts."

Is further information obtainable from you, or could you tell us to whom we may write? M. Nachtwelt, The National Research Bureau, Inc., Chicago.

Further information may be obtained from The International Nickel Co., 67 Wall St., New York 5, N. Y. We suggest you address your inquiry to Mr. A. Gagnebin.—Ed.

Shell Molding

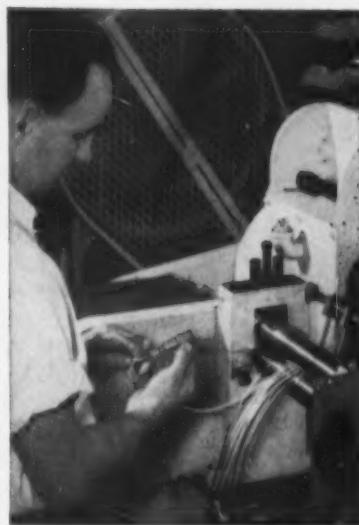
Sir:

Referring to the Jan. 13 Newsfront, we would appreciate your informing us which American firm is selling this installation and to which German house. We are interested in this process and would be pleased if we were able to contact either the American or the German house. H. G. Fient, Partner, Industrial Consulting & Management Engineering Co., Zurich, Switzerland.

Details on the shell molding machine may be obtained by contacting Shalco Engineering Corp., Palo Alto, Calif.—Ed.



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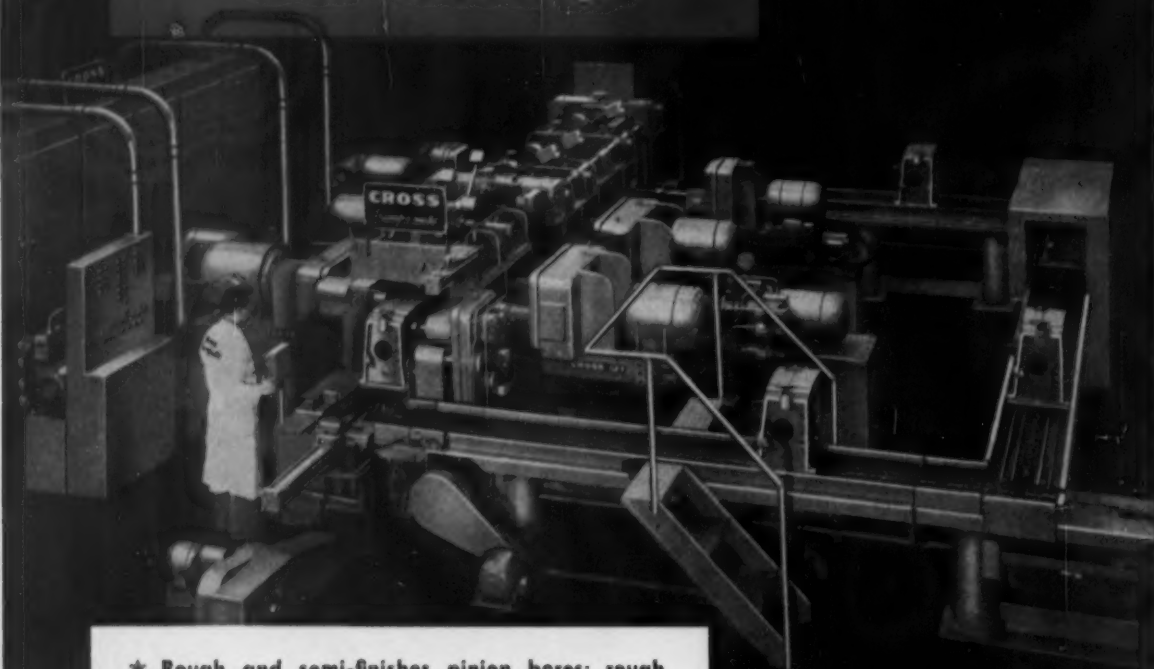
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Say It With Flowers!

Letters and telegrams keep pouring in to wish THE IRON AGE well and all the best and keep up the good fight and get well fast on its 100th Anniversary which we are celebrating this year which makes us the oldest industrial business paper in America and you don't no longer find them like that hardly any more. Most of the letters, of course, are addressed to the publisher and editor which is neat, right and so to do, of course. But here's one that was sent direct to your tired old fatigued cracked editor. When you read it you will see why. No doubt?

Congratulations on 100th Anniversary!

Everyone feels proud as he passes life's milestones.

There is no better time, than when celebrating an anniversary, to let your friends and customers know you appreciate their service, support and loyalty.

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Comes from Larry Heint's Greenhouses in Toledo, Ohio. Larry, ole boy, we're sold. Please send 44,375 of your very best sample anniversary plants to our 44,375 subscribers, and boost that to 177,500 to take care of all our readers. We'll get around to marrying them later.

More

... and Mr. William R. Sullivan, 720 West Tenth Pl., Los Angeles,

by William M. Coffey

writes, "Until a solution is found for the traffic problem, let us keep some of the cars off the streets by having a stricter driving code."

... and Tom Campbell's bon mot (fr. *ibid*) for today is "hindsight is always 20-20." And you don't hardly ever find them like that no more either.

Puzzlers

The answer to the *le baggage* (fr.) puzzler goes like this (Jan. 6 issue): One passenger has 150 lb of baggage, the other passenger has 200 lb. The railway allows 100 lb per passenger without charge and imposes a levy of half a cent on excess poundage. And the winners: Roy H. Millenson, George W. Frederick, F. S. Nisbet, C. W. McKinley, Charles (Whee!) Vunovic and Puzzlers Anonymous, G. D. Rahrer, Patricia Crawford, Ole Ridg, ole A. L. Raich and thanks for the kind words, Ray Anderson and thanks for the kind words, W. Norman McVay and thanks for the kind words, W. B. Lobbenberg, Simon Grubman, ole Jim Mull and Marilyn and thanks for the kind words, and M. M. Lawrence.

New Puzzler

Six peddlers having 20, 40, 60, 80, 100 and 120 lengths each of cloth reach a market place. Before commencing the sale, they agree upon a uniform rate and decide to transact in whole number of dollars only. When it became no longer possible for each peddler to sell any more of his cloth under these conditions, they shift to another market. Deciding upon a different but uniform rate, each peddler sells off the cloth left with him from the first market. At the end, each peddler finds the same amount of sale money with him.

What are the two rates and the amount of sale money each peddler got?

unique in design —
rugged in construction

GREEN PANTOGRAPH ENGRAVERS

THE FAMOUS
MODEL 106



The three-dimensional bench Model 106 cuts costs — engraves, routs, profiles, giving you expert results even by unskilled workers.

THE NEW
HEAVY-DUTY
MODEL D-2



The Model D-2 heavy-duty two dimensional Pantograph is a precision machine with a multitude of new features. Open on three sides, it permits complete freedom for engraving, milling, profiling large panels (up to 36" in diameter) or bulk pieces. Single, micrometer adjustment controls vertical depth of cut, automatically adjusting copy table with pantograph. Range of reduction ratios from 2-to-1 to infinity! Vertical range over 10 inches!

For complete information, write to:

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INSTRUMENT COMPANY
365 Putnam Ave. Cambridge, Mass.

Export Agent—Fratton Co.
33 W. 42nd Street, New York 36, N. Y.



small work

in stride

...the

heavy job

with ease



Photos courtesy Robert Reiner, Inc., Weehawken, N. J.

This user reports a saving of 25% with this Cincinnati Bickford Super Service Radial.

The machine was installed primarily to handle large work. However, it was found to be a profitable time saver on the smaller work as well.

3 hours on a smaller machine was cut to 2 hours and 15 minutes. 17 holes from $\frac{3}{4}$ " to $1\frac{1}{2}$ " are being drilled on the job.

This powerful radial is so easy to handle it is a money-saver on both small and large work. All controls are at the operator's finger tips.

Write for Bulletin R-29.

**CINCINNATI
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

FEBRUARY

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS—Annual meeting, Feb. 14-17, Conrad Hilton Hotel, Chicago. Institute headquarters are at 29 W. 39th St., New York.

DROP FORGING ASSN.—Winter Industry meeting, Feb. 17-18, Statler Hotel, New York. Association headquarters are at 605 Hanna Bldg., Cleveland.

MARCH

PORCELAIN ENAMEL INSTITUTE—Pacific Coast conference, Mar. 10-11, Biltmore Hotel, Los Angeles. Institute headquarters are at Dupont Circle Bldg., 1346 Connecticut Ave., N. W., Washington, D. C.

EXPOSITIONS

NATIONAL ASSN. OF CORROSION ENGINEERS—Annual meeting and Show, Mar. 7-11, Palmer House, Chicago. Association headquarters are at 1061 M & M Bldg., Houston.

AMERICAN SOCIETY FOR METALS—Western Metal Exposition and Congress, Mar. 28-Apr. 1, Pan Pacific Auditorium, Los Angeles. Society headquarters are at 7201 Euclid Ave., Cleveland.

NATIONAL MACHINE TOOL BUILDERS' ASSN.—Machine Tool Show, Sept. 6-17, International Amphitheatre, Chicago. Association headquarters are at 2071 E. 102nd St., Cleveland.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 14-15, Drake Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

AMERICAN SOCIETY OF TOOL ENGINEERS—Annual meeting, Mar. 14-15, Shrine Auditorium and Exposition Hall, Los Angeles. Society headquarters are at 10700 Puritan Ave., Detroit.

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—Annual convention, Mar. 20-22, The Conrad Hilton Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

INTERNATIONAL ACETYLENE ASSN.—Annual spring convention, Mar. 22-24, Shamrock Hotel, Houston. Association headquarters are at 30 E. 42nd St., New York.

AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Spring meeting, Mar. 25-26, The Greenbrier, White Sulphur Springs, West Va. Association headquarters are at 1900 Arch St., Philadelphia.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Annual meeting, Mar. 29-31, Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.

APRIL

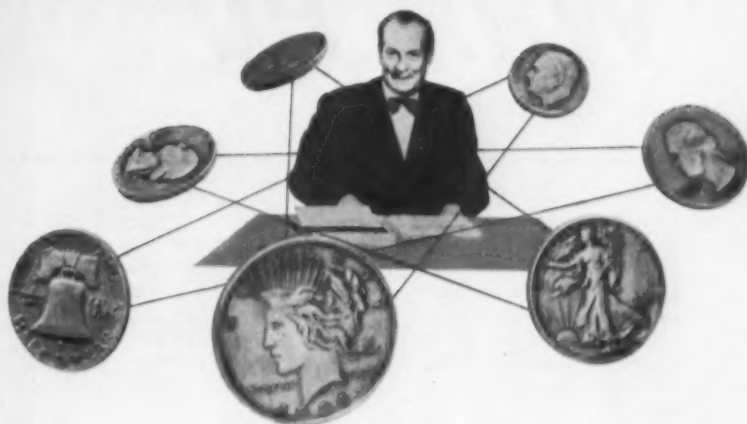
AMERICAN HARDWARE MANUFACTURERS ASSN.—Spring meeting, Apr. 10-14, Palm Beach, Fla. Association headquarters are at 242 Madison Ave., New York.

WIRE REINFORCEMENT INSTITUTE, INC.—Spring meeting, Apr. 11, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at National Press Bldg., Washington, D. C.

CONCRETE REINFORCING STEEL INSTITUTE—Annual meeting, Apr. 11-16, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 38 S. Dearborn St., Chicago.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS—Annual meeting and exhibit, Apr. 13-15, Sherman Hotel, Chicago. Society headquarters are at 84 E. Randolph St., Chicago.

when competition crowds you



give yourself dollar room

INVESTIGATE HELLER FINANCING PLANS FOR METAL WORKING PLANTS

Many businessmen are now feeling a pressure of competition that could be eased, in a few days, by more cash for current operations.

With cash you can do business more efficiently and economically. You can buy to better advantage, take trade discounts, extend broader credits to your trade, buy more efficient equipment, cut your internal operating costs.

In many cases, the dollars exist in your business in the form of receivables, inventory, or other assets which can be turned into immediate cash by a Walter E. Heller & Company plan of commercial financing fitted to your special needs.

Throughout America, companies of various sizes in many different lines of industry are now using Heller funds and Heller plans at the rate of

more than \$600,000,000 annually. Management and profits are not affected by Walter E. Heller & Company financial arrangements, which are purely a financial service. This service is available to companies which qualify, for any required period . . . months or years, in amounts as little as \$25,000 or more than \$3,000,000. Banks know and recommend Heller service as a supplement to normal bank financing.

If competition now has you in a corner, it will pay you to write immediately for a free copy of "Operating Dollars for Every Business" which will give you a general picture, with case histories, of Heller operations. Write today. If you have a financial problem to which our service might apply, tell us about it in confidence or invite us to telephone.



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10 E. 40th ST., NEW YORK, NEW YORK

wanted:

lower

The installation of a new Danly Press in any press line can produce exceptional cost-cutting results. This fact has been proved in the production records of leading stamping shops throughout the country. But when you count pieces at the end of a shift, it's the efficiency of the *whole* line that really counts. That's why production chiefs are specifying *complete* lines of new Danly Presses.

Running together as an integrated production unit, Danly Presses turn out more finished stampings per shift—at lower cost and with fewer line shutdowns. This is the kind of performance *you* can expect from Danly Presses. The reasons for it are many: Danly's heavier, more rugged construction gives the reserve strength necessary to meet the demands of continuous peak-load line operation. Automatic oil lubrication saves hundreds of hours of press maintenance. Exclusive electrical and pneumatic control devices permit convenient automation adaptability and increased safety. Danly's cooler running clutch and brake wear longer, need less replacement. From blanking to finished stamping, every Danly Press delivers more work per shift. Write to Danly today . . . experienced press engineers will be glad to discuss your specific stamping problems.

DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue, Chicago 50, Illinois



It costs less to run a DANLY PRESS line!



specify:

COMPLETE

cost stamping output

Here is a line of Danly Presses in a leading stamping shop, working together as an integrated production unit. A line like this multiplies the production and cost advantages of each Danly Press . . . turns individual press efficiency into plant production efficiency and profit. Danly offers any presses you need to make up your line . . . single, double or triple action . . . over-drive or underdrive . . . from 50 to 3000 tons.



ATE DANLY PRESS LINES



How Do Lightweight Refractories Cut Fuel Costs And Boost Furnace Output?

Here, certainly, is a timely question. There's a heavy squeeze today on most furnace operators for lower costs, larger production . . . or both. And despite all the economies they've put into effect so far, they're still searching hard for ways to make their furnace dollars do a bigger job.



The following discussion brings out a number of facts, often overlooked, about the money-saving, profit-building potentials inherent in lightweight insulating firebrick.

Q. First of all, just what do you mean by "lightweight" insulating firebrick?

A. Compared with dense, fireclay brick weighing approximately 7½ to 8½ pounds each, insulating firebrick range from about 3½ pounds down to slightly over 1 pound for various temperature requirements.

Q. What does this light weight have to do with lower production costs?

A. Briefly, heavy furnace linings waste your fuel dollars two ways:

They soak up and store large quantities of heat which are lost when the furnace is cooled; and they conduct and lose too much heat through the wall.

Lightweight insulating firebrick, on the other hand, contain millions of tiny air cells, heat up and cool quickly, absorbing and storing very little heat. Also, they resist heat flow, keeping it inside the furnace to do productive work.

Q. I can see why you would save on fuel—but how much?

A. There's no single answer to that question—there are too many variables to be considered. But to give you an

idea of these savings, here are a few actual examples:

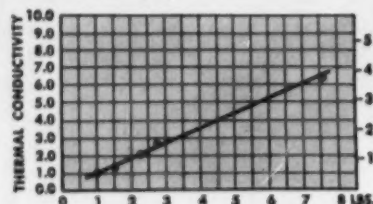
The operator of a large forge furnace cut his fuel costs more than 50% after changing to lightweight insulating firebrick.

A manufacturer of electric kilns states that insulating firebrick result in heat savings of fully 25%.

A magnesium melting crucible furnace that formerly used 1,000,000 BTU's per hour now does the same job with 500,000 BTU's, thanks to insulating firebrick.

Q. Increased production has also been pointed out as an advantage of insulating firebrick. How do you explain this?

A. Again the answer lies in lightness of weight. Because lightweight firebrick store and conduct less heat, they come up to operating temperature faster—cool down faster, too. This means—shorter heating cycles.



Relation between weight and thermal conductivity for several brands of kaolin base refractories. (mean temperature, 900°F)

Secondly, because lightweight firebrick conduct far less heat than heavy, dense firebrick, you don't have to build as thick a wall. This gives you more hearth area per square foot of floor space.

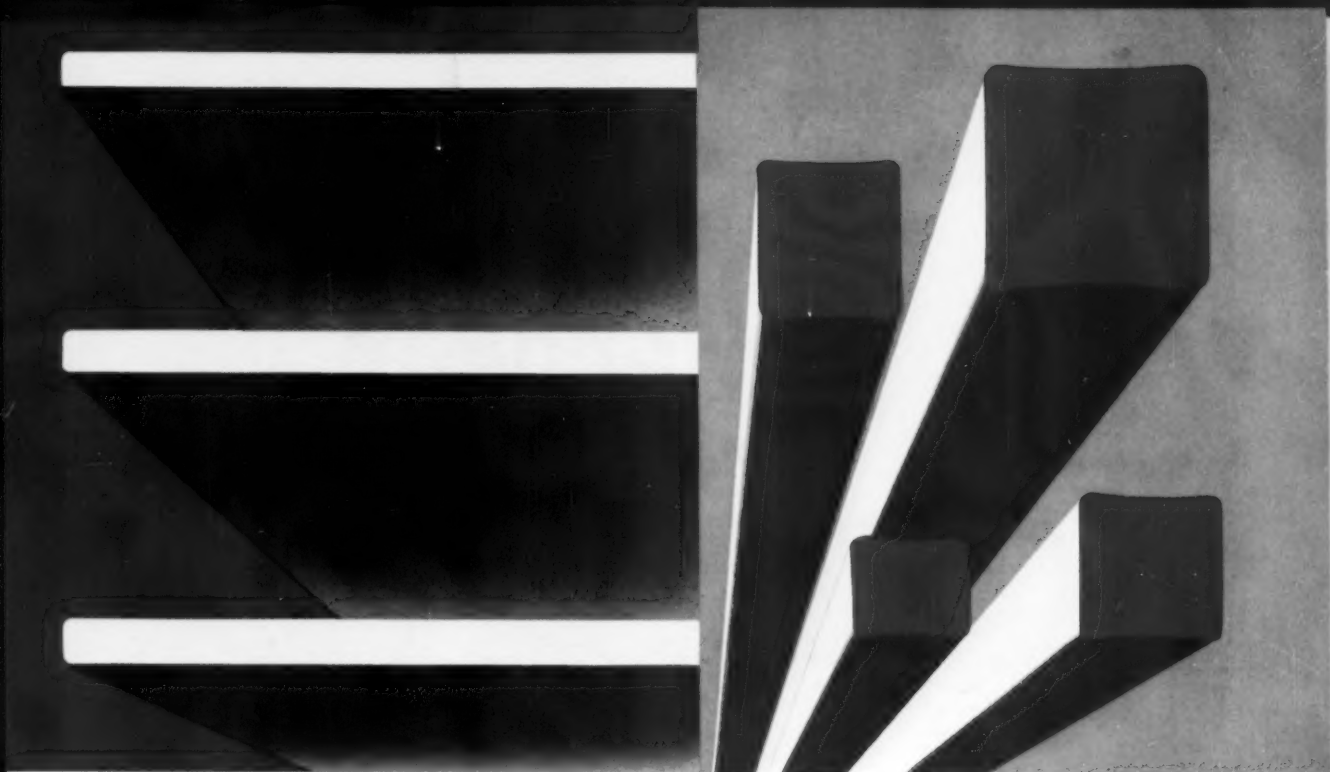
Thirdly, lightweight firebrick respond more rapidly to changes in furnace heat input, which means closer temperature control and fewer rejects in many instances.

It's just like adding extra furnace capacity without adding to your furnace investment.

Q. Are there any differences in the performance of the various brands of insulating firebrick available?

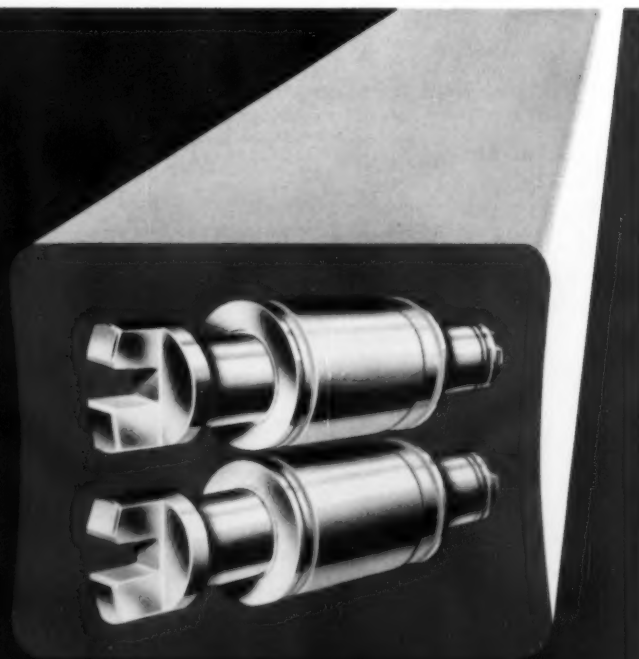
A. Naturally, the lighter the brick the greater the fuel savings and furnace output. And the lightest insulating firebrick of all, for any temperature range—if you'll pardon our mentioning it—are B&W Insulating Firebrick.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga. B-900



IN SLABBING MILLS AND BLOOMING MILLS

Productioneering begins with Mack-Hemp Rolls



If you've been keeping your eye on what's new at Mack-Hemp, you already know about the improvements in Striped Red Wabblers blooming and slabbing mill rolls.

But, just in case you missed hearing users talk about these *production tools*, you'll be interested in their capabilities.

Actually, Mack-Hemp has applied some new heat-treating techniques to reduce susceptibility to fire-cracking. These metallurgical improvements are important because they help increase blooming and slabbing mill production.

There's no time like the present to discuss these efficient Striped Red Wabblers Rolls, and you'll certainly want to know something about their service records. Meanwhile, though, you'll find it's worthwhile to keep an eye on *everything that's new at Mack-Hemp*.



MACKINTOSH-HEMPHILL CO.

Makers of the Rolls with the Striped Red Wabblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: all types of cast mill rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners—electronically controlled contouring lathes—screw feed roll turning lathes—heavy duty engine lathes . . . shears . . . end-thrust bearings . . . steel and special alloy castings . . . reversing hot strip mills . . . Y-type cold strip mills

Some
COLD FACTS
on Savings Made by
AMERICAN
Phillips SCREWS

*for Refrigerator
 (and other Appliance)
 Manufacturers*

Look at those decorative, cross-recessed screwheads on the snowy surfaces of today's refrigerators and freezers. One reason American Phillips Screws are used here is that the drivers don't slip out to slash and spoil the sleek finish.



Other reasons for the increasing use of American Phillips Screws among appliance makers are the savings that come from speed with safety, more screws driven with less effort, tighter fastenings with fewer screws per unit of assembly. That's exactly why one leading refrigerator maker changes more assembly operations to American Phillips every time he changes models . . . and why many other top hard-goods manufacturers are now 100% American Phillips. Now the more fastening operations *you* have, the sooner you will find out that American Phillips Screws *always* cost least to use. Care to have this proved? Just write.

X marks the spot
 . . . the mark of extra quality

AMERICAN SCREW CO.

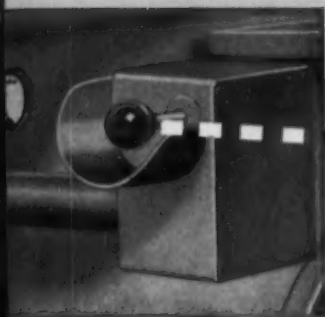
PHILLIPS HEADquarters
 WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
 Warehouse and office at Chicago
 Office, Detroit, Michigan

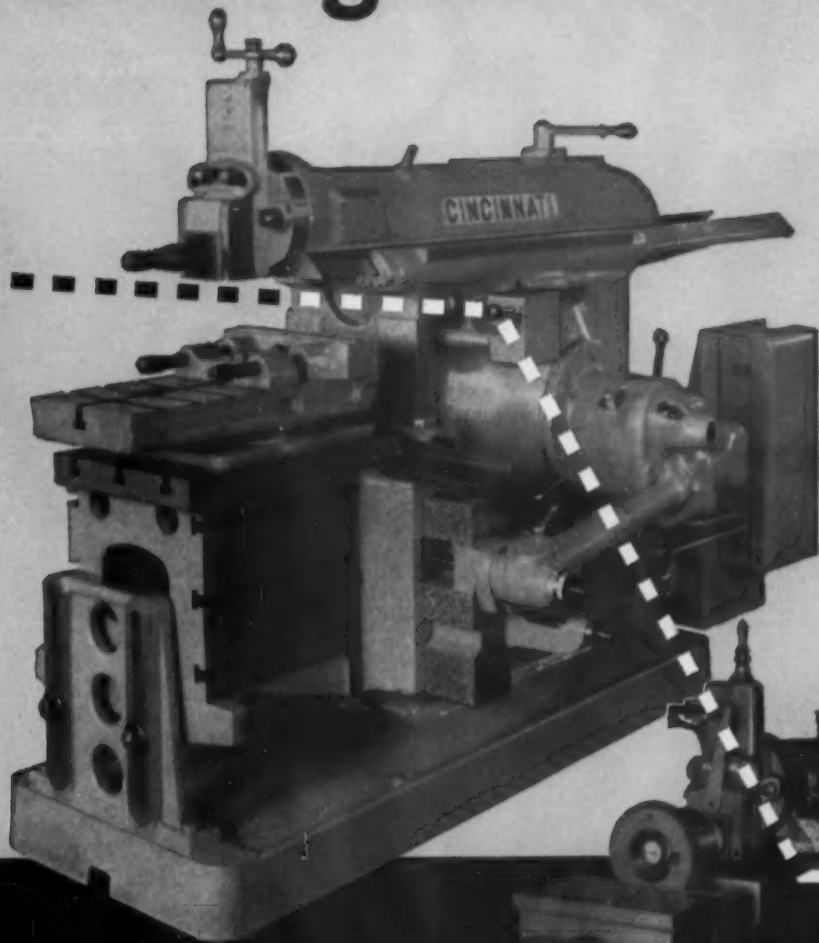


Outstanding Time Saver...

...Outstanding ACCURACY



**Single
Control
Lever**



The New Cincinnati Magnetic Clutch and Brake, with its single, convenient control lever, gives the operator the fastest, simplest and most accurate control of his Shaper and converts waste time into productive time.

This powerful clutch and brake requires no adjustment, and has a long, maintenance-free life.

Write for Cincinnati Shaper Catalog N-6.



30% Time Saving

Shaping time on 7 internal oil grooves in these steel sleeves was reduced from 12.8 minutes to 8 minutes, by the Cincinnati Electro-Magnetic Clutch and Brake.



THE CINCINNATI SHAPER CO.

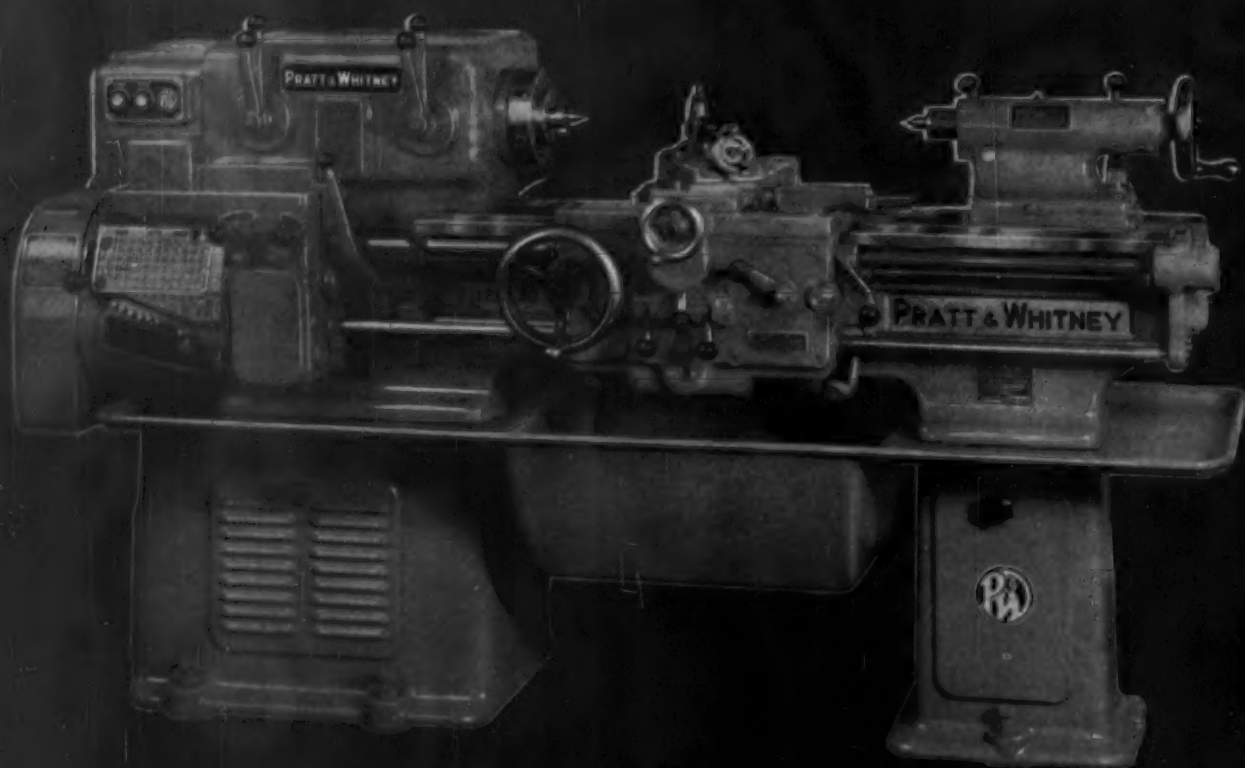
CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

Traditionally the Finest...

PRATT & WHITNEY

Model "C" Lathes



12" and 16" SIZES IN STANDARD BED LENGTHS



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SINCE 1860



First Choice  *for Accuracy*

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NOW... EVEN BETTER

Wherever "almost as good" isn't good enough, manufacturers throughout industry have traditionally relied on Pratt & Whitney Model "C" Lathes. Finest example of all that Pratt & Whitney stands for, the Model "C" makes it possible to establish and maintain the highest standards of tool room accuracy that are reflected in more efficient, more economical production and in improved product quality.

The standard by which all fine lathes are judged, Model "C" Lathes have always incorporated every detail of advanced design, carefully selected materials, skillful manufacture and rigid inspection that can contribute to precision performance and convenient operation.

However, we at Pratt & Whitney believe that even the best can be made better . . . and we are proud to present the new Model "C" Lathes. Incorporating many important improvements, as well as a more modern appearance, they offer greater precision and convenience than any previous lathes.

Advanced Features

NEW BALL BEARING TAPER ATTACHMENT . . .

eliminates lost motion, backlash and friction. Smooth accurate tapers can be turned or bored even when taking exceptionally heavy cuts. Preloaded ball bearings in the taper bar shoe are mounted on eccentric studs to permit easy adjustment if required. Cross feed screw and all bearing surfaces are hardened and ground to assure long, accurate life.

COMPLETELY REDESIGNED TAILSTOCK . . .

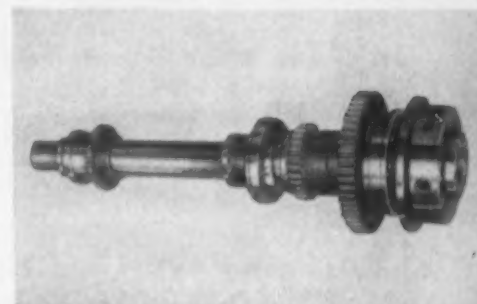
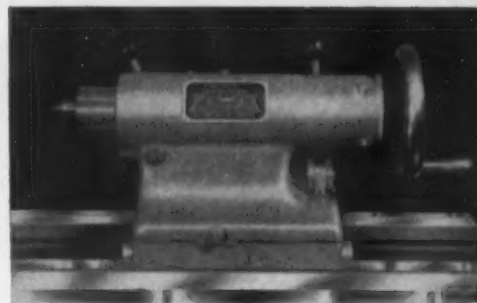
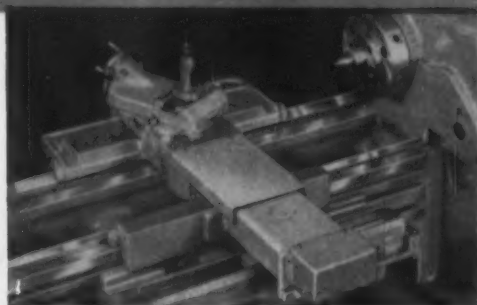
is locked solidly in position on the bed by operating a single lever. This actuates two clamps simultaneously for either normal or very heavy work. New, spring loaded ball bearing mounting, supports nearly all the weight of the tailstock; when the binder is released, very little effort is required to move it on the bed. Spring bronze wipers at both ends of the tailstock base in contact with the bed at all times protect the accurately ground ways.

SUPER-PRECISION SPINDLE . . .

a beautiful piece of precision work. It is hollow to accommodate a draw-back . . . hardened and ground, and mounted at three points. The two front bearings, spaced closely to provide rigid front support, are preloaded super-precision ball bearings. The rear end bearing is of the anti-friction needle type.

HARDENED AND PRECISION GROUND BED WAYS . . .

give longer life with continued accuracy; they meet rigidly high P&W standards for parallelism, flatness, V formation, finish and hardness. The illustration shows a carriage way being tested; total end-to-end error must not exceed .0002" with the straightedge in several positions.



GIVE YOURSELF THE ADVANTAGE . . . EQUIP WITH THE NEWEST AND FINEST . . .

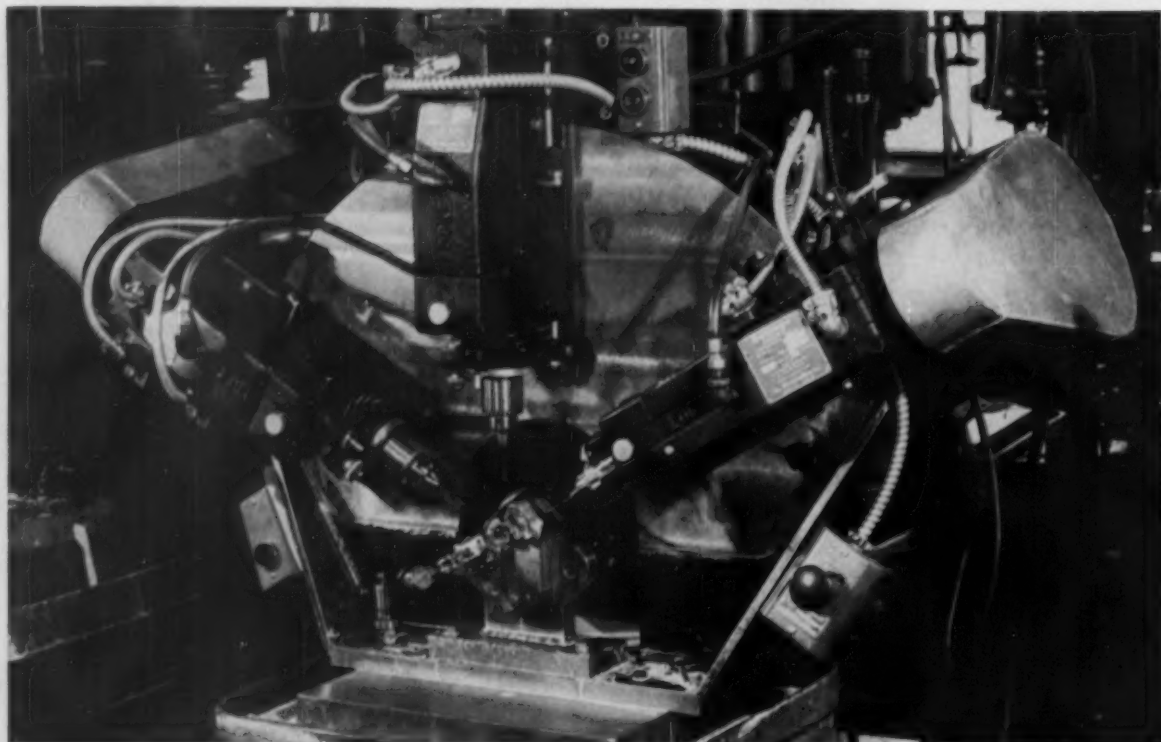
today for complete information on the new, improved Model "C" Lathes. Write on your Company letterhead for your free copy of Circular No. 539-1.



The Case of The Bellows Co.
VERSUS
The High Cost of Drilling Holes

Testimony taken by tape recording in the plant of
[REDACTED], Detroit, Michigan

Operation: Drilling $\frac{1}{4}$ " holes in hex head aircraft bolts on a
tool-room-built machine, using three Bellows-Locke Drill Units



1102A

Statement of [REDACTED], General Superintendent

Q. How was this operation performed before you built this special machine?

A. We drilled on a single spindle by hand, with an index fixture to locate the three stations. However, it was difficult to hold a true position and the hole did not come through parallel from one end to another.

Q. Why wouldn't it come through parallel?

A. On account of feed and speed. The feed had to be controlled by hand.

Q. The old way, besides hand feeding, you would have to hand index the part?

A. Right. We had to index every time we drilled a hole.

Q. Can you give me a comparison of production rates on the old method and on this machine?

A. We increased almost 50%.

Q. What is the highest rate of production you get on this machine?

A. Somewhere around 240 pieces per hour.

Q. What other advantages have you found? You get a good deal less spoilage on finished parts, don't you?

A. Yes, considerably. We hardly get any spoilage at all now.

Q. On the old method, did you need to use a skilled operator?

A. Well, he had to know something about it in order to handle the drill carefully. When we're using a No. 60 drill, it does require a person that knows how to handle it.

Q. On this machine, you just use a girl operator, don't you?

A. That's all—the machine takes anybody as long as they can put a part in and press the button and take the part out.

Q. How long has this machine been in operation in your shop?

A. I can't tell exactly—about six months or more.

Q. Has it been working every day?

A. 9 hours a day, 5 days, sometimes 6 days, a week.

- Q. Do you have other Bellows equipment in your plant here?
- A. We have two infeeds on centerless grinders; we have all our milling machines operated by Bellows Air Motors; vises operated by Air motors; also on Dearborn fixtures which we index; as well as Air Motors on collets—it's all Bellows operated.
- Q. Do you find this equipment adaptable for use on other machine tools?
- A. Yes, we find it can be used on any machine.
- Q. How long have you been using Bellows equipment here?
- A. Ever since I remember—around 1945 or '46, during the last war.
- Q. Do you have any of those old Bellows Air Motors around here now?
- A. Yes, we have quite a few—a number of them were destroyed in 1948 when we had a fire, but after the fire we were able to overhaul them and put them back on the machines.
- Q. You mean you put them in operation after they were damaged in the fire?
- A. That's right.
- Q. Are they still working?
- A. Some of them are still working.
- Q. They must be about 10 years old now?
- A. Yes, they must be.

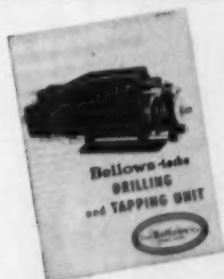
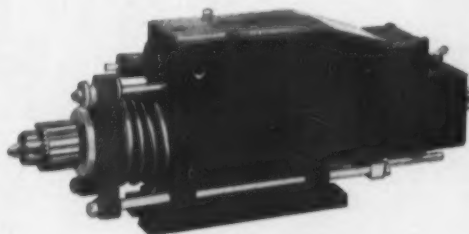
Statement of [REDACTED], Machine Operator

- Q. [REDACTED], how long have you worked here?
- A. Eight months.

- Q. Did you do this operation on the old machine where you had to do it by hand?
- A. Yes, sir.
- Q. Could you tell me a little bit about that?
- A. Well, it was not as easy to work as this new machine.
- Q. Why was it hard to work on the old machine?
- A. Well, you had to turn it every time you drilled and on the automatic, it turns by itself.
- Q. And each time you turned it, did you have to pull the drill down?
- A. Yes, we had to pull the drill down each time we drilled a hole.
- Q. Did your shoulders get tired?
- A. Oh, yes. It made your arms and shoulders awfully tired.
- Q. Did you have to take any rest periods on the old machine?
- A. Yes, because my arms would get so tired I couldn't keep on working.
- Q. How often would you have to rest?
- A. About twice during the morning.
- Q. When you'd go out to lunch after working on this old machine—did your arms get stiff or anything like that?
- A. Yes, at night—especially when I'd quit work, they'd get awful stiff.
- Q. What did you do for it?
- A. Rub them and bathe them and that's about all, I guess. Then do it again the next day.
- Q. I imagine you like this new operation pretty well?
- A. Oh, yes, I like this fine.

The electrically driven spindle is fed by air power up to the work at which point hydraulic feed control takes over. Built-in speed controls permit regulation of rapid traverse. Drill depth adjustable up to 3". Drilling capacity up to $\frac{3}{8}$ " in mild steel. All controls are built-in. Valving is electrically actuated. Depth accuracy .005" (with optional electric depth control .001"). Optional deep hole drilling controls. Available in three types: pulley driven, in-line direct motor drive, or parallel mount motor drive. Also available with reversing motor for direct tapping operations.

This Is the Drill Unit That Increased Hole Drilling Production Almost 50%



WRITE FOR THIS BOOKLET

Describes the Bellows-Locke Drill Unit in detail—shows how and where it can be used to best advantage. Free on request. Address: The Bellows Co., Dept. 1A255, Akron 9, Ohio.

1182A

The Bellows Co.
AKRON, OHIO

MAIL COUPON FOR BULLETIN

- ☐ Please send me free Bulletin on Bellows-Locke Drilling and Tapping Units:

Name: _____

Company: _____

Address: _____

1A255

THIS NEW MONARCH HEAVY



The MONARCH SERIES 90 DYNA-SHIFT HEAVY DUTY LATHE—Model 2500: Clearance diameter—40" . . . Swing over cross slide 25".
Model 2501: Clearance diameter—44" . . . Swing over cross slide 31". Model 2502: Clearance diameter—48" . . . Swing over cross slide 36".

DUTY DYNA-SHIFT

Has a Headstock that Thinks!

Set the Work Diameter Indicator—Get Ideal Spindle R.P.M. in a wink—36 speeds from 6 to 750 R.P.M.

Think you've seen everything in lathes? Take a look! The new Monarch Series 90 Dyna-Shift marks a revolution in lathe design!

Its heart and soul is the exclusive Monarch Dyna-Shift drive headstock. With it any speed change may be made in seconds with it never being necessary for the operator to calculate the spindle speed (R.P.M.) from the work diameter and the desired surface speed (S.F.P.M.). He merely sets the work diameter indicator to the diameter to be turned. In a wink he gets the correct speed automatically, accurately, positively, and this speed is indicated for reference. What's more, with motor capacity equivalent to 60 H.P., this machine has the power to break and the speed to burn any carbide tool. Here's the ultimate proficiency in the use of carbide tooling—and on work of considerable size.

Imagine a machine with all the following advantages. Imagine it in terms of lowered costs! The Series 90 Dyna-Shift:

1. Permits heavy depths of cut to be taken at more than average surface speeds.
2. Allows carbide tooling to be used to its fullest advantage.
3. Shears metal off cleanly at its proper cutting speed and feed.
4. Because it may always be used at its proper cutting speed and feed, it allows the ideal cutting condition of maximum tool life, heavy stock removal and close accuracy.
5. Combines convenience of operation with safety factors which adds to the machine's productiveness and the operator's enthusiasm for the piece of equipment on which he makes his living.

You'll want the full story of this great new lathe—for new it is from end to end! The Dyna-Shift and the many other features are revealed in detail in a complete 24-page illustrated booklet. Fill out the coupon today and let us send it. It's worth getting!—**The Monarch Machine Tool Company, Sidney, Ohio.**



When progressing from diameter to diameter, speed is changed in a few seconds with the flick of one dial. The machine calculates each speed and changes speed automatically. And the wide available range assures selection of the right speed for diameter to be turned.



Monarch
TURNING MACHINES

**FOR A BETTER TURN...
TURN THE PAGE 90°
—AND LOOK!**

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio
Gentlemen:

- ☐ I am interested in your Dyna-Shift story. Please send me your illustrated Booklet #1601 with complete data.
☐ Please have a Monarch sales engineer call on me.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

FAMOUS FIRSTS IN THE IRON-STEEL INDUSTRY

**22 YEARS
DOWN-TIME!**



There was a span of 22 years between the time the first American blast furnace was completed, until the time the first ton of iron was commercially produced.

In 1620 John Berkeley and a group of followers left England to build the first ironworks in America at Falling Creek, Virginia. As Berkeley and his crew cleared the land, erected houses and began constructing the furnace, the ever-present, suspicious Indians watched in the background.

Just as the blast furnace was to begin operation on March 22, 1622, the Indians attacked the ironworks and surrounding settlement. During the ensuing massacre the Indians killed all but one of the 384 colonists, and completely destroyed the furnace.

It was not until 22 years later, in Massachusetts, that the first successful American ironworks began producing iron.

Fortunately, the beginning of BAKER'S MAGDOLITE, the original dead-burned dolomite was more successful, because BAKER'S MAGDOLITE—then as now—offered producers lower refractory costs, increased furnace efficiency and more uniform ingots. It's MAGDOLITE's superior, properly burned, grain-sized particles that make the difference. BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Strength, Economy and Quality. The next time you order dead-burned dolomite, specify BAKER'S MAGDOLITE.

1-55

ANOTHER FAMOUS FIRST

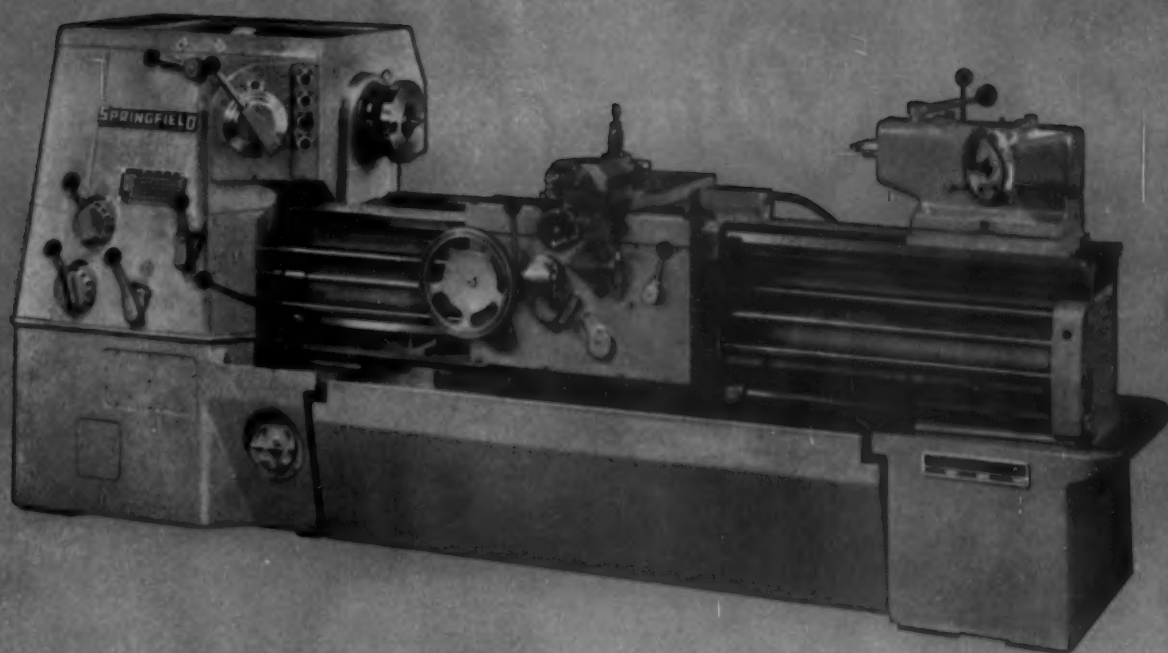


BAKER'S MAGDOLITE

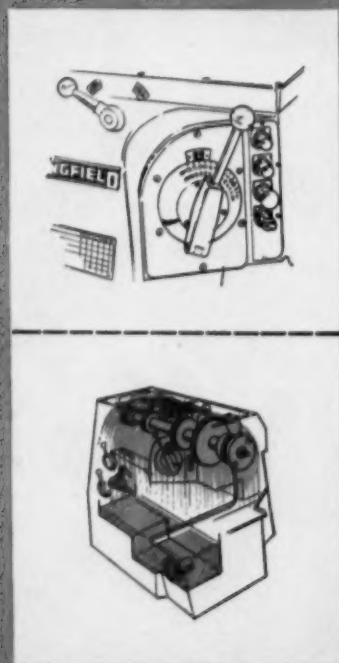
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO



because it's simple



It does more work. Operators produce more with less fatigue because of Springfield's simple, responsive, easy-to-reach controls. *It runs cooler.* Continuous oil-mist lubrication carries heat away; cooler head minimizes distortion, maximizes accuracy. *It saves power, cuts wear.* Only the gears necessary for the selected speed are engaged; other gears run free. *It makes maintenance easy.* Clean design cuts maintenance time, promotes better shop practices.

Engine and toolroom lathes: swings 14" to 32".

Contouring and reproducing lathes: swings 14" to 32".

Universal vertical grinders: swings 21" to 52".

Write for the name of your Springfield dealer.

THE SPRINGFIELD MACHINE TOOL CO., SPRINGFIELD, OHIO

SPRINGFIELD

At United Specialties Co....

Here's Diversified Toolroom Turning—



Turning Spin Blocks (dies) for TV Cones—

United uses 24" tool steel blocks to spin their metal TV cones. Large swing capacity in their LeBlond Toolroom lathe allows them to handle these die-turning jobs promptly as they are needed. They get high speed, excellent finish and accurate contours.

from 1000 lb. Spin Blocks to Contoured Stamping Dies

Accomplished with smooth-powered LeBlond 25" Tracing Lathe

Toolroom jobs at United Specialties Co., Chicago, required a big-swing lathe for pieces like heavy spin-blocks, plus convenience and ease of handling on smaller die jobs—many with difficult contours.

Sales engineers at our Chicago Office recommended a LeBlond 25" Heavy-Duty Lathe with Hydra-Trace. It gave United just what they needed—big-swing, smooth power, a lathe that could tackle virtually any of their die-turning jobs.

Mr. M. J. Perkovich, Toolroom Superintendent for United Specialties, says "Our LeBlond Lathe with Hydra-Trace works at least 75% to 175% faster than previous methods. And it completely removes all 'guesswork' on the part of our operators when shapes and radii are involved."

In the toolroom or on the production line, you can count on LeBlond Heavy-Duties with Hydra-Trace to have plenty of "beef" for heavy hogging, plenty of accuracy for extra-fine finish. And they're ideal for complex contour and angle work. Hydra-Trace attachment is easily and quickly installed or removed. Gives maximum flexibility of adjustment for best working angle.

LeBlond Heavy-Duty features include: 4-direction power rapid traverse built into apron; one-piece double-wall apron, hardened rack; totally-enclosed quick-change box; hardened and ground replaceable steel bed ways; thrust lock tailstock. See your LeBlond Distributor today or write for bulletin *HD 155T-C*.

Hydra-Trace (Trade Mark, Registered U. S. Pat. Office) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of the compound rest on practically all LeBlond Lathes.

.... cut with confidence



Turning mating dies for stamped air-cleaner parts—United stamps out complicated ridged and contoured air-cleaner parts, in many sizes and shapes. In each case, mating "re-draw and size" dies are needed. Die shown above, for instance, has 11" O. D. with complex contours and angles, calling for tool "dive-in" on some surfaces. As a result, top cutting speeds cannot be used. United happily found that their LeBlond 25" gives them all the power they need, even at low rpm—with no stalling, no shakes and jitters, no ruined dies or frayed tempers.

LEBLOND
of Cincinnati

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO
WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 67 YEARS.

Minneapolis-Moline reduces costs 40% with Republic Cold Drawn Steels!



Here's a new Republic product for mass producing certain parts faster, more uniformly and at less cost—Republic Iron Powder. It is ideal for fabricating complicated shapes which are difficult to produce economically by other means. Republic metallurgists can help you determine iron powder's suitability to your parts. Or, they will suggest alternate methods or materials better suited to your operation.



When parts require high strength, fine surface, toughness, hardenability, close tolerance or accuracy of section, you get them all in Republic Cold Drawn Alloy Steels—plus **UNIFORM MACHINABILITY**. Your high-speed automatics can take full advantage of these cost-cutting qualities. Designers can make full use of the high strength and uniform structure produced by cold drawing. Production men get the ideal combination of wearability and strength from the uniform hardenability and toughness of alloy steel.

The power-takeoff shafts on the self-propelled Minneapolis-Moline Harvester carry a heavy load. Requirements called for a minimum-yield strength of 100,000 p.s.i. It was necessary that these shafts consistently meet minimum requirements in order to eliminate or to minimize failure in service.

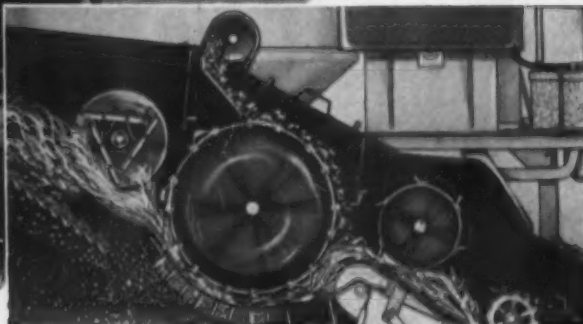
In addition, material that had to be stress-relieved, straightened and precision-ground was expensive.

Republic's Field Service Specialists were invited to work on this problem with Minneapolis-Moline Engineers. The solution was a switch to Republic C-1050 Cold Drawn Steel.

Now, the company is getting the proper physicals needed to do the job. And, costs

REPUBLIC

World's Widest Range of Standard



This cutaway view of the Minneapolis-Moline Harvester shows the power-takeoff shafts made from Republic Cold Drawn Steel.

have been reduced approximately 35 to 40% since the switch to Republic C-1050 Cold Drawn. They buy the shafting in four-foot lengths. The only finishing operations necessary are: threading the ends, key-seating the shaft, and centerless grinding the bearing areas to close tolerances.

Naturally, not all cold finished steel requirements are the same. To make sure that you get the most out of the Republic Cold Drawn Steels you buy, Republic provides a full-time field service staffed by expert metallurgists and machining specialists. They will visit your plant, work with your staff on solving cost and production problems.

Call your nearby Republic sales office for the facts. Or mail the coupon.



Steel parts, like these printing-plate clip bars, are made at a great saving from Republic Special Sections. The bars are cold drawn to predominating cross section of the part. Cold drawing gives your steel parts higher strength, greater hardness and a bright smooth finish. Cutting to length and drilling are often the only operations necessary to finish the part. Sections can be produced in a wide variety of analyses with contour variation almost limitless.

STEEL

Steels and Steel Products

REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio



Please send literature on:

☐ Cold Drawn Steels

☐ Special Sections

☐ Iron Powder

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Company _____

Address _____

City _____ Zone _____ State _____

S-7487



Photo Courtesy of Seco Safety Products Co.

Flat-Folding, Rubber-Lined Hose For Quick, Sure Action Protection

Qua-Flex fire hose is specially constructed to fold flat. This makes it highly adaptable for storage on racks, even those designed for unlined linen hose. When hose is pulled from rack, pins drop easily and hose does not kink. It takes up less space than most other types of fire hose. That's why it's so popular for fire protection service in office buildings, institutions, industrial plants, ships, or wherever space is limited. It is quickly and easily dried after use; hence frequent testing doesn't damage it.

This hose is ideal for use with

a fog nozzle—an advantage over linen hose, and one that is usually found only in larger, heavier hose.

The tube is made of a slow-aging, non-acid-forming, synthetic rubber compound that always remains resilient, resists cracking and stays leak-proof. The jacket is evenly woven of long staple cotton yarn. Tube and jacket are tightly bonded together for strength and long life.

Qua-Flex is available in I.D. sizes 1½", 2" and 2½", all guaranteed to withstand a test pressure of 300 p.s.i., in 25, 50, 75 and 100

foot lengths. Popular 1½" size has Factory Mutual Approval.

We also manufacture a complete line of industrial and municipal fire hose, as well as a complete line of industrial rubber products: belting, hose, packing and moulded rubber of every construction for every need. Through your Quaker and Quaker Pioneer distributor our research and engineering services are always available to help you solve any fire protection or industrial rubber problem. Write for free folder and name of nearest distributor.

QUAKER RUBBER CORPORATION
Philadelphia 24, Pennsylvania

HKP
N. E. PIONEER RUBBER MILLS, INC.
OF PITTSBURGH

QUAKER PIONEER RUBBER MILLS
San Francisco 7, California

What size is a quality fastener?



Here are two ELASTIC STOP® nuts.

Each has the familiar red locking collar. Each is self-locking, vibration-proof and can be reused many times. Each is a fast, readily assembled one-piece unit . . . will maintain accurate adjustment anywhere on a bolt.

Each will afford positive protection against thread corrosion . . . prevent liquid seepage along bolts. Each is manufactured in quantity. Each is exactly controlled as to quality of raw material, finished dimensions, class of thread fit, seat squareness and finish. Each has a record for precision and uniformly high performance that is unmatched.

But . . . one measures 1/10 inch across the flats; the other, 4 inches. Between these two, there are more than 530 different hex nuts in the ESNA line. They are the result of variations in height, material, finish and size.

Look to ESNA for the top quality self-locking fastener that fits your need best.

ELASTIC STOP NUT CORPORATION OF AMERICA



Elastic Stop Nut Corporation of America

Dept. N58-277, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin

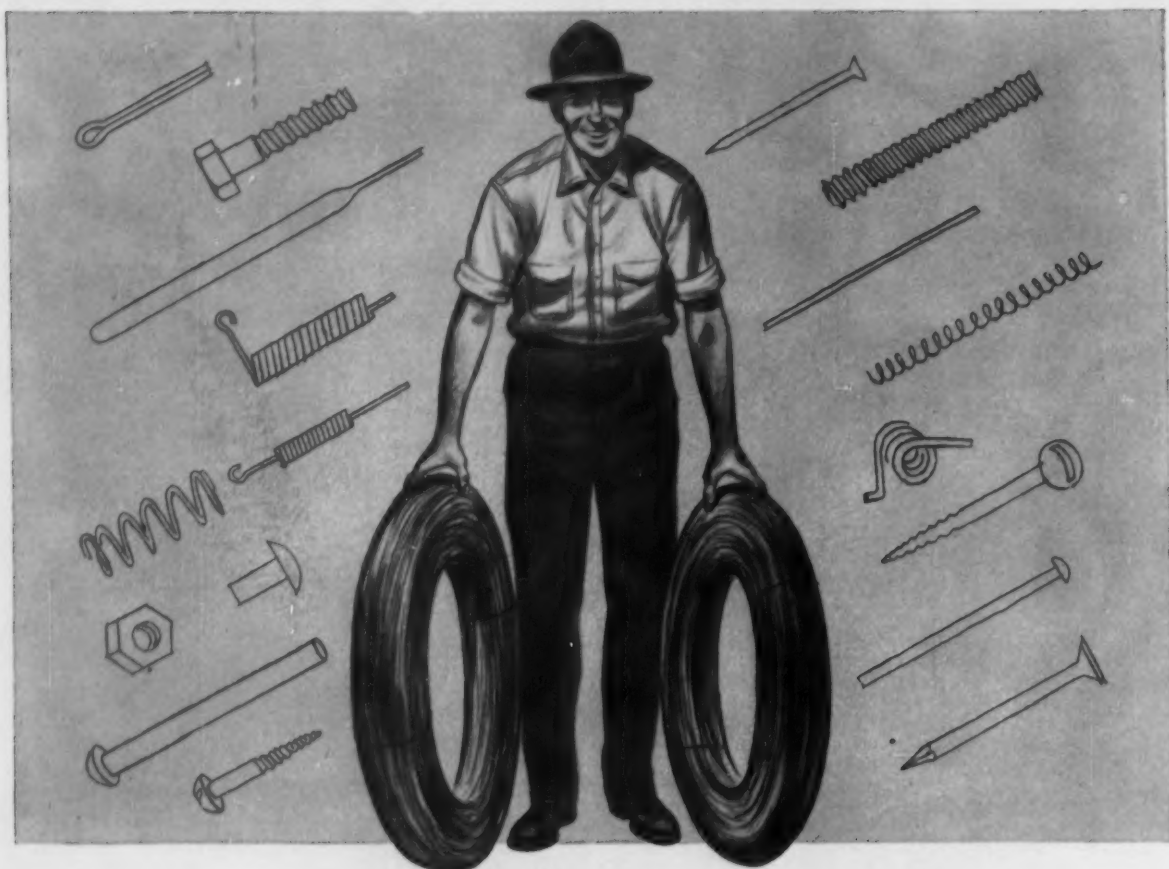
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____



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for
your copy



"ALLEGHENY METAL Stainless Wire"

This 20-page booklet contains full information on AL Stainless Wire products... analyses, physical properties, corrosion resistance, principal uses, etc.—also handy tables of wire weights and measures and other useful data. Ask for it today.

Address Dept. A-621

COLD HEADING WIRE... Ready for immediate shipment: Allegheny Metal cold heading wire to meet your production requirements, in a wide range of sizes from $\frac{5}{8}$ " dia. down to 0.050".

SPRING WIRE... Also immediately available to your order, a wide selection of sizes of Allegheny Metal spring wire is carried in stock at convenient locations. Sizes ranging down to .004" dia. are ready for prompt shipment.

● Let us supply your immediate needs for these stainless wire products. The A-L Branch Office nearest to you will welcome your inquiries. Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

Make it BETTER-and LONGER LASTING
with **Allegheny Metal**



W&O-8210

FARREL RING GEAR



Twenty-foot boring mill table turned upside down to show the Farrel ring gear.

gives driving smoothness to boring mill table

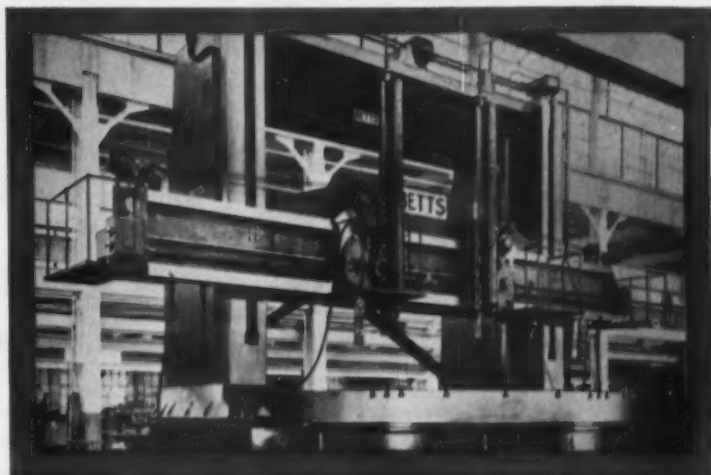
The huge single-helical ring gear built into this twenty-foot boring mill table is an important factor in obtaining an extremely fine finish on work turned on the mill.

Designed to impart driving smoothness to the table, both the gear and its mating pinion are precision generated by Farrel to a high degree of accuracy, and carefully fitted to eliminate the possibility of backlash. The pinion shaft is worm driven and this, together with the wide-angle helical gear, provides a smooth, chatter-free drive.

The gear, which is split, has a 30° right-hand helix angle, 276 teeth, 1½ DP. Its inside diameter is 183.294" and the face is 9¾" wide.

Farrel precision-generated internal gears are available with either helical or spur teeth in sizes up to 16 feet diameter, 12 inch face, ¾ DP. They are made of the finest grade materials.

Farrel engineers will be glad to assist you in working out unusual gear problems. Why not call on them?



FARREL-BIRMINGHAM COMPANY, INC. ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Memphis, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

The table is used on this Betts boring mill, made by Consolidated Machine Tool Corporation, Rochester, N. Y.

FB-940

Farrel-Birmingham®



Announcing

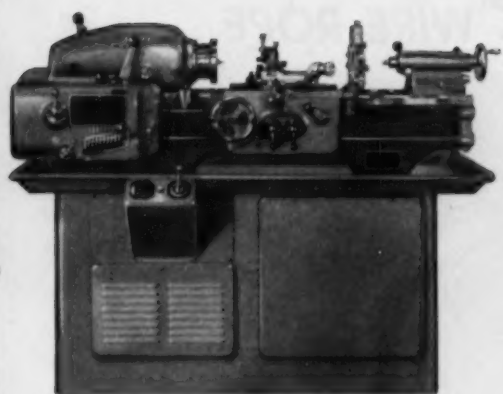
the
Hendey **machine division**
of

BARBER-COLMAN COMPANY

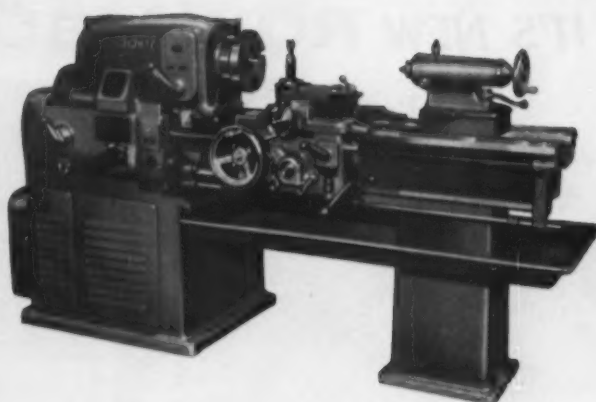
The manufacturing rights for the products of the Hendey Machine Company have been acquired by Barber-Colman Company. Hendey toolroom and production lathes and Hendey shapers will be manufactured by the Hendey Machine Division of Barber-Colman Company at Rockford, Illinois.

Barber-Colman will manufacture these lathes and shapers with all the special skills and techniques which have made its gear hobbing machines and hob sharpening machines of such outstanding quality. Users of Hendey machines will be afforded the same excellent service which Barber-Colman has always extended to its customers.

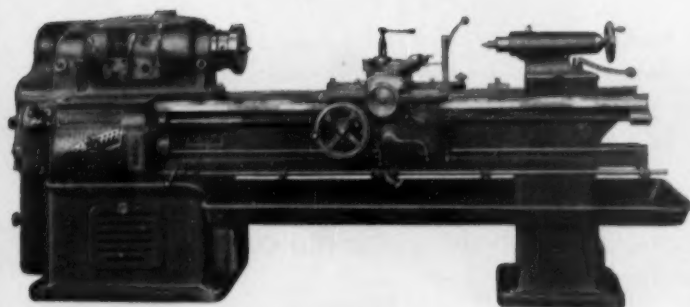
For further information about Hendey lathes and shapers, call your nearest Hendey representative or write to the Hendey Machine Division, Barber-Colman Company, Rockford, Illinois.



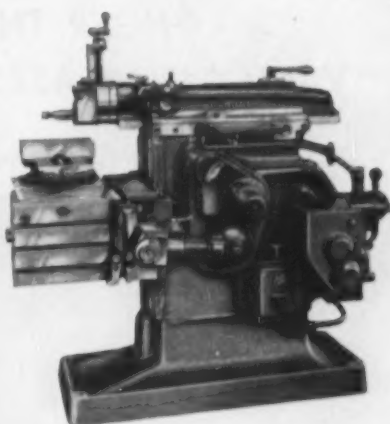
9" Tool and Gagemakers' Lathe



No. 2E General Purpose 14" Lathe



12", 14" and 16" — 18 speed Geared Head Lathe



12" High-Speed Shaper

Hendey machine division

BARBER-COLMAN COMPANY

211 LOOMIS ST., ROCKFORD, ILL.



ROEBLING ANNOUNCES TO AMERICAN INDUSTRY IT'S NEW **ROYAL BLUE** WIRE ROPE...



**STRONGER THAN YESTERDAY'S STRONGEST!
VASTLY INCREASES — EVEN DOUBLES — SERVICE LIFE!**

WITH THE DEVELOPMENT of Roebling type 1105 wire — the finest high carbon rope wire ever produced — Roebling leads the field in bringing American industry the unprecedented efficiency and economy inherent in its new **ROYAL BLUE** Wire Rope.

★ Roebling is ready to supply the new **ROYAL BLUE** Wire Rope in **EVERY DIAMETER** from $\frac{1}{4}$ " to $3\frac{1}{2}$ " and in **EVERY STANDARD CONSTRUCTION** with an independent wire rope core.



★ Roebling guarantees **ROYAL BLUE** Wire Rope to be at least 15% stronger than any standard wire rope of the same size and construction formerly available.

★ Roebling **ROYAL BLUE** Wire Rope has unequalled resistance to impact, crushing, abrasion and fatigue.

Write us for the full story on **ROYAL BLUE** Wire Rope, or
contact your distributor or nearest Roebling branch office.

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JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 BLEEKER ST. • CHICAGO, 5526 W. ROOSEVELT RD. • CINCINNATI, 2355 FREDDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5516 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOUR ST. • NEW YORK, 19 NECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 250 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST.  

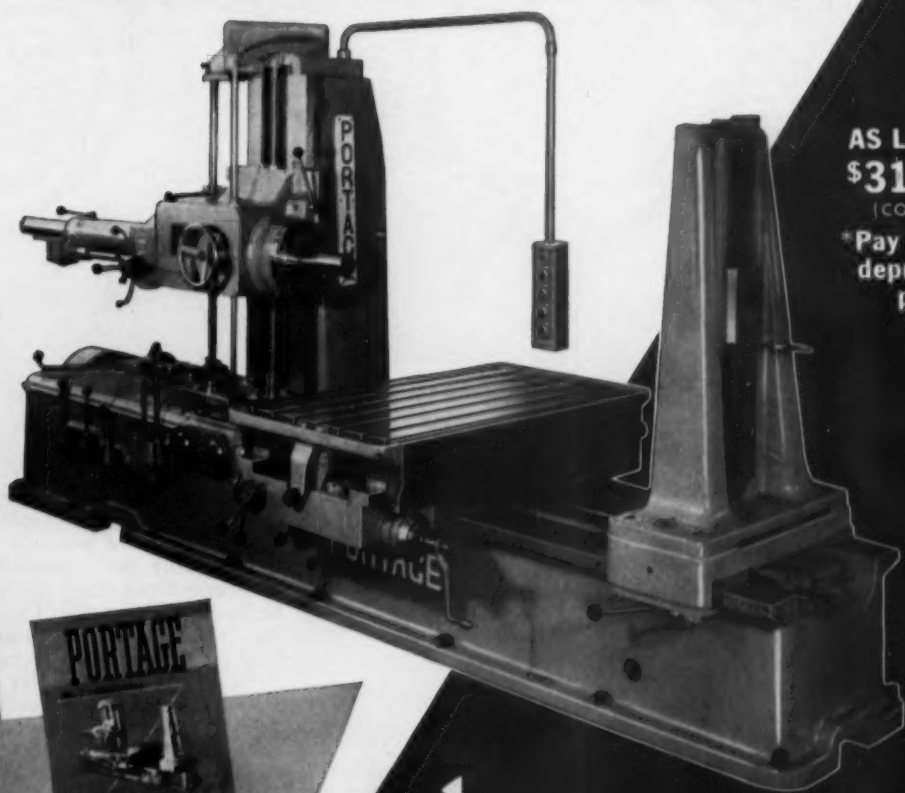
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(4" Diameter Spindle)

Horizontal Boring, Drilling & Milling Machine Outstanding ...

MACHINE OF THE YEAR
Unsurpassed in Price and Quality



AS LOW AS
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(COMPLETE)

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depreciate
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PORTAGE

The PORTAGE Boring, Drilling & Milling Machine offers a real saving in new machine investment. PORTAGE mills cost from 5% to 20% LESS than present comparable makes ... and the amazing part of this savings is the machine itself ... Write today for literature covering all the specifications and features on the PORTAGE Mill.

* For full particulars, phone the factory today!

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THE "PLUS FACTOR" FOR EFFICIENT ELECTRICAL INSTALLATIONS



4 WAYS TO GREATER EFFICIENCY LOWER INSTALLATION COSTS

1 HOT GALVANIZED: The specially selected pipe for this conduit is first thoroughly cleaned by pickling and then immersed in a bath of molten pure zinc. Process which leaves a clean, smooth coating of zinc on both the outside and inside of the pipe, the pipe is accurately threaded. A coating of tough transparent enamel is baked on both the outside and inside of the conduit, providing a smooth raceway through which wires may be readily laid.

2 ELECTRO GALVANIZED: The pipe after being threaded, reamed and carefully inspected is again thoroughly cleaned before galvanizing. The galvanizing equipment is so devised and arranged that the exterior from one end to the other. Tests are continually made to insure proper weight of coating. A coat of tough, smooth, and elastic black enamel is then baked on the interior.

3 BLACK ENAMELED: After dipping in the enamel, the conduit is allowed to set to insure uniform thickness of the coating and to prevent wrinkling. The loaded coils of pipe are then placed in baking ovens where an even temperature is carefully maintained by pyrometers. The enamel is baked to a high bakable finish, resulting in a thorough tight coat with proper bonding or turning operation during installation.

4 ELECTRICAL METALLIC TUBING: The exterior is given a anti-rust protective coating of pure zinc by the electro-galvanic process. This coating will withstand bending without flaking. On the inside is baked a tough, elastic coating of enamel which serves both as a corrosion-resistant recovery through which wires are laid and as an added protection for the wiring system.

YOUNGSTOWN BUCKEYE CONDUIT

Write for this new folder
about first aid
for wiring protection

Youngstown



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Manufacturers of
Carbon, Alloy and Yulox Steel

The story of 5 benefits Wayne Screw Products gets from using STANICUT CUTTING OIL



Plant Foreman Al Ziegman (left) and Standard industrial lubrication specialist L. J. Loomis examine pitch diameter of screw threads. L. J. Loomis' engineering background plus his field experience in industrial lubrication, customers find, pays off for them. Lee is a graduate of Tri-State college of Indiana with a B.S. degree. Before entering field work, he completed Standard Sales Engineering School.

STANICUT 137 BC Oil solved finish problem for Wayne Screw Products Company, gave better finish on screw and machined parts like these—plus four other important benefits.

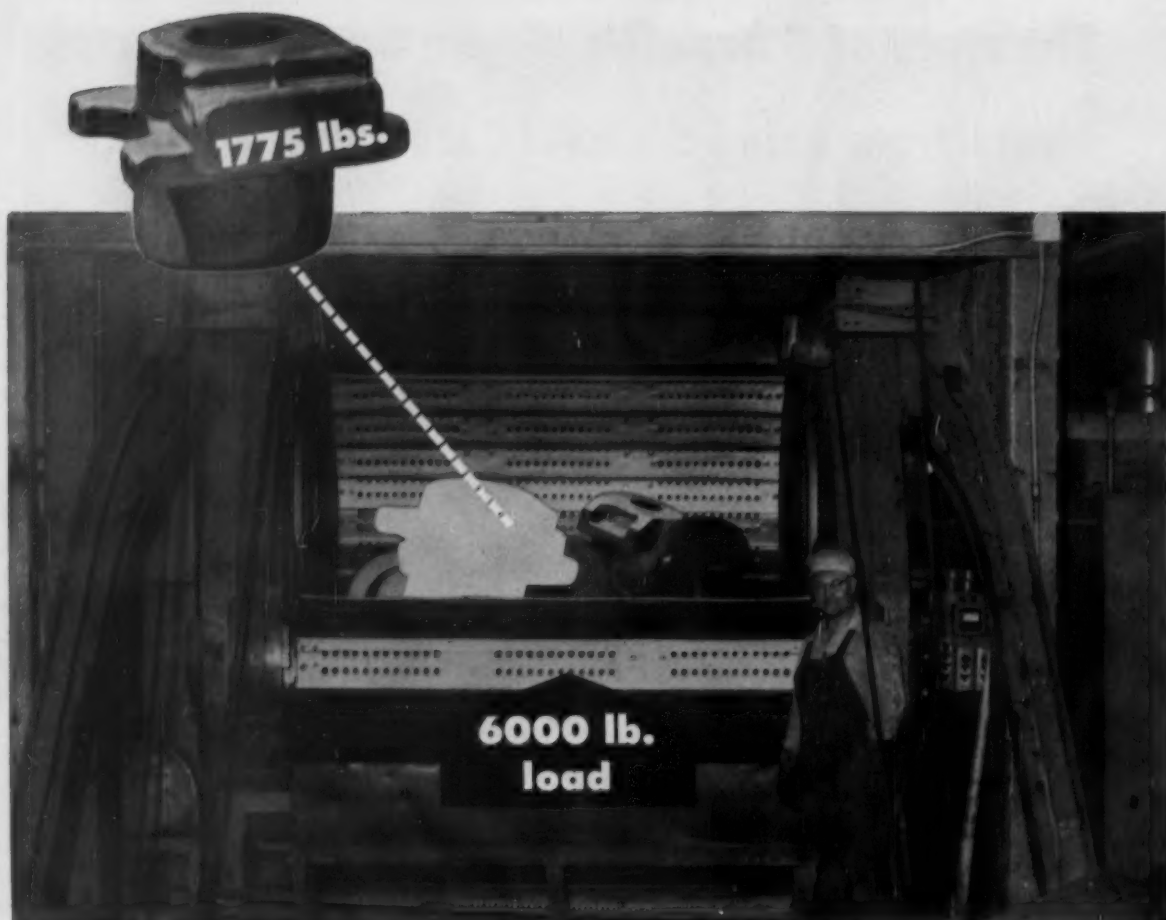
Management at Wayne Screw Products Company, Detroit, found they were not getting a completely satisfactory finish on aircraft quality stainless steel, which the plant was machining. They followed a suggestion made by their Standard Oil lubrication specialist to switch to STANICUT 137 BC Oil. The result: five benefits. (1) Better finish (2) Higher quality work (3) Longer tool life (4) Higher production because of less down time for tool sharpening and adjusting (5) Cutting oil costs reduced approximately 50%.

At first STANICUT 137 BC Oil was used in two automatic screw machines—a National Acme Multi-Spindle and a Brown & Sharp Single Spindle. Production benefits prompted Wayne Screw Products to convert other equipment to STANICUT 137 BC Oil—and with similar results.

Delivering benefits like this is an old story for STANICUT 137 BC Oil. A Standard Oil lubrication specialist will be happy to demonstrate how Standard's cutting oils can perform with similar results for you. In the midwest, a call to your nearby Standard Oil office will bring a prompt response. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY
(Indiana)



WHEELABRATOR® Cleans 6000 to 7000 lb. Loads in 15 minutes

5000 tons of forgings cleaned monthly

King size performance on king size payloads! Every 15 minutes, from 6000 to 7000 lbs. of huge steel forgings are spotlessly cleaned in each of two Wheelabrator airless abrasive blast cleaning machines at Cameron Iron Works, Houston, Texas. Included in this production are forgings weighing nearly a ton apiece — forgings in shapes and sizes far beyond anything previously available.

To clean this heavy, bulky type of work at the production rates required, only the 60"x96" Wheelabrator Tumbblast (63 cu. ft. operating load capacity) could meet all requirements. Operation and performance of the two units have far surpassed their expectations in high production speed and low overall cleaning cost.

Because most forgings are cleaned three times — first to remove a tough forging scale, again after

chipping and finally after heat treating—the two Wheelabrators, along with two smaller units, handle more than 5000 tons of forgings monthly. Only one operator and a helper are required to man the four Wheelabrators — labor costs are insignificant considering the tonnages handled.

Even though your cleaning problem may not be on such a big scale, Wheelabrator airless blast cleaning can be applied with cost saving economy to your problem. Write today for Catalog 74C for complete information.



World's largest builders of airless blast equipment

AMERICAN WHEELABRATOR & EQUIPMENT CORP. 510 S. Byrkit St., Mishawaka, Indiana



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"Rare Earths—Dollars and Sense"

- Improved Compound
- Smaller Quantity Required
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\$3.00/lb.
or
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or
\$6.75/Ton

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2 lbs./Ton
\$1.50/lb.
or
\$3.00/Ton

1954
1½ lbs./Ton
\$1.00/lb.
or
\$1.50/Ton

So rapid has been the advance in technical progress and use of rare earths (Trade Name: MCA RareMeT Compound) that in the brief span of four years, about one-fourth as much is needed to accomplish the desired results, at one-third the cost per pound. Now, the economics in favor of rare earths are ten times as great as they were four years ago.

In OPEN HEARTH STEELS, the improvement in addition practice is making rare earths more and more economical, actually cutting production costs. Excellent results with STAINLESS STEEL in hot workability and increased yield have been verified consistently.

Most steel producers, conscious of their customers' increasing demands for better quality, greater

uniformity, and consistently good iron and steel are actively engaged in research employing rare earths. If the cost of iron and steel producing is at all interesting to you, or if customer rejections play any part in your operations, it will pay you to investigate the intelligent use of MCA RareMeT Compound. A letter addressed to any office will bring prompt and confidential response.



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CORPORATION OF AMERICA

Grant Building

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battery of 9" and 21" x 44" Lewis four-high Foil Mills

. . . high production mills roll foil at speeds up to 4000 fpm

Whether you want to start with an ingot from a hot mill or start with coils, you can get a full range of Lewis equipment, designed and built to meet your specific requirements. Over one hundred modern Lewis Foil Mills, for example, are now successfully operating in plants of the country's top ranking aluminum foil producers.

Built in various sizes and widths to meet individual customer requirements, these Lewis Foil Mills include the latest design in bearings, electric tension control, thermal control and

handling equipment. They usually start with .030" or .026" sheet and can reduce down to .00025" . . . at speeds ranging from 1000 to 4000 feet per minute.

So call us in the next time you're in the market for a mill to roll aluminum. Our engineers, who have had extensive experience in the development of high speed mills, will study your requirements with you. This experience plus modern manufacturing facilities will assure you of getting the type of equipment best suited to your specific needs.

LEWIS four-high FOIL MILL

BLAW-KNOX COMPANY • LEWIS MACHINERY DIVISION
PITTSBURGH 30, PA.



LEWIS PRODUCTS: Two-High Mills • Three-High Mills • Four-High Mills • Strip Mills • Bar, Billet and Structural Mills • Plate Mills • Rod Mills • Coilers • Tables • Shears • Pinion Stands • Gear Drives • Roll Lathes

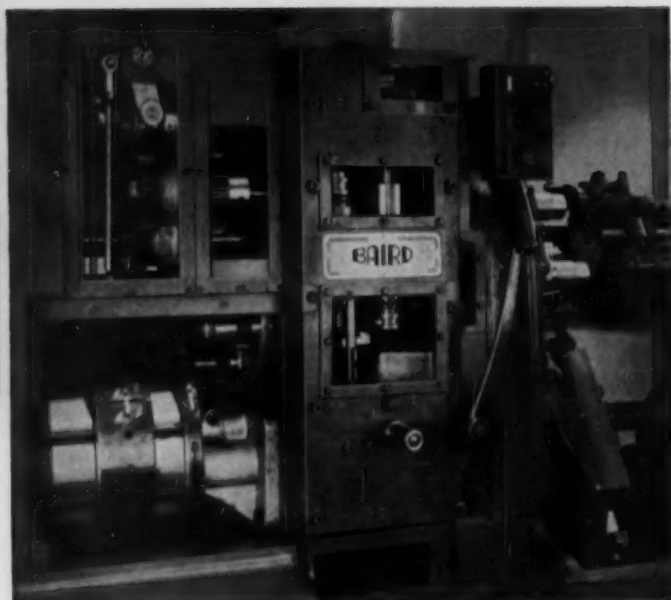
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One of the features of Baird machines that customers like best is that when they are tooled and put on production . . . they produce. In many cases, however, arrival at that happy result in our customer's plant is by no means as simple as it sounds. Hence our "Guinea Pig" and other special Baird engineering procedures. The "Guinea Pig," as you can see from this photograph, is just that . . . a regular Baird Multiple Spindle Automatic, with plastic windows let into its "hide" at many vital points. By this means we can check details of operation under controlled conditions. Cams, gearing, controls, interlocks, tool slide action, temperatures, lubrication, wear . . . just about every factor in performance . . . is seen, gaged and compared.

And that, we believe, is typical of Baird's whole approach to high production machinery and tooling. For years, people have said "ASK BAIRD ABOUT IT" only because they know we will give them the right answer. Send in your inquiries, gentlemen — we're never too busy to help. Write Dept. I.A.

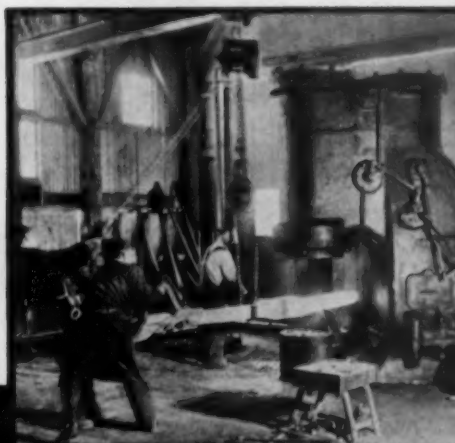
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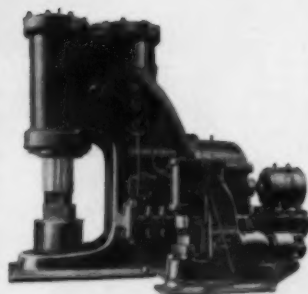


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The Chambersburg Motor Driven Pneumatic Forging Hammer is a self-contained forging unit that can be installed independent of steam or air lines and is capable of handling a wide variety of forging work from simple blacksmithing to machinery repair and maintenance work. It has a built-in motor driven air compressor and can be installed wherever electric current is available. Heavy anvil, high impact speeds, powerful blows and easy control of blows distinguish this versatile hammer. Sizes 200 lbs. to 5000 lbs. Write for a copy of Bulletin 16-L-9.

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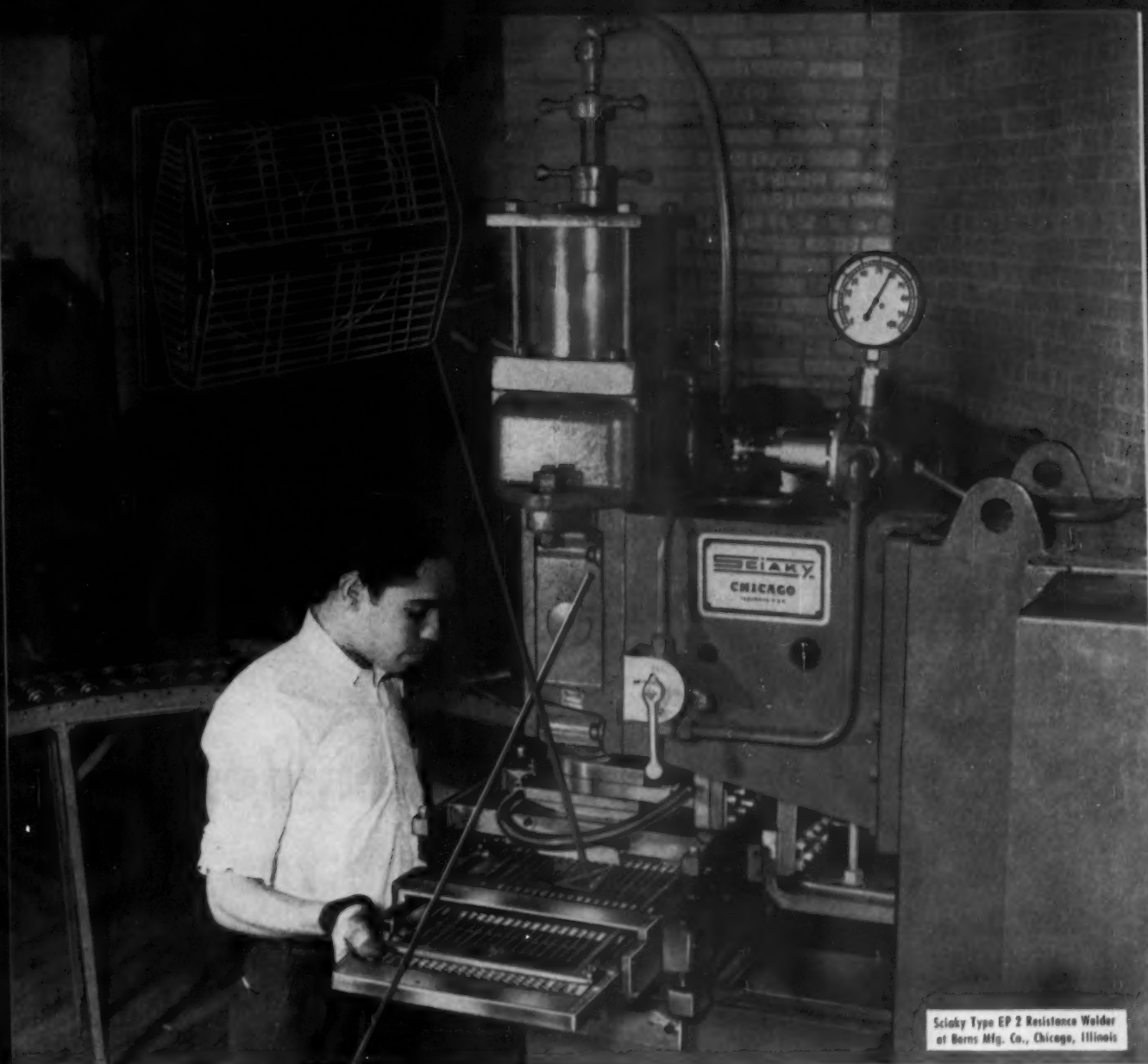
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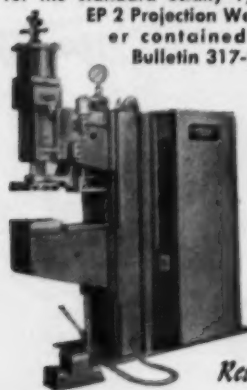
SCRAP METAL BALING PRESSES



Sciaky Type EP 2 Resistance Welder
of Berns Mfg. Co., Chicago, Illinois

NEW SCIAYK DESIGN . . . COMPETITIVELY PRICED

Write for complete specifications showing minimum to maximum welding capacities for the standard Sciaky Type EP 2 Projection Welder contained in Bulletin 317-2.



PRODUCTION JUMPS 420% . . .

One Standard Sciaky Welder Does the Work of Four!

With one welder Berns was producing only one-quarter the needed production of 29 piece, 10 gauge wire grills for their nationally known Air King Fan. Instead of selling three more machines, Sciaky provided the newly designed, standard EP 2 Welder equipped with simple tooling to replace the original machine. Production jumped 420% as one machine does the work of four plus, the customer has the original welder for other work.

Write for the complete details of Berns' impressive production increase and equipment savings as well as other similar examples of single welder applications contained in "Resistance Welding at Work", Vol. 4, No. 1.

These typical advantages of Sciaky resistance welding may well be applied to your fabricating operations. Welders designed to do more useful work at lower operating cost with maximum reliability is basic to Sciaky design.

*Largest Manufacturers of Electric
Resistance Welding Machines in the World*

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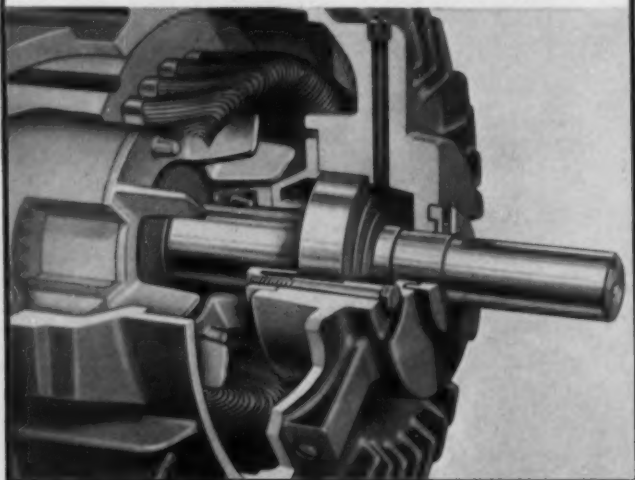
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MOTORS

**This
Bearing,
fully enclosed
and protected,**

**yet easy to grease when desired
... gives more value for your
motor dollar**

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.



Lubricate without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide both means for inserting new grease and a means of flushing out old grease.



Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.



ALLIS-CHALMERS



A-4575

The Iron Age Newsfront

McDonald Strengthens Position

The United Steelworkers' McDonald has come out stronger than ever in the AFL-CIO merger. He pointed the way in his September 1954 speech in Atlantic City, directed the ball-carriers in committee scrimmage. He remains the head of an autonomous union within the new organization, and is being credited with the status of labor statesman who fought for a principle and won.

Measures Volume of Ore and Coal

Electronics, credited with an \$8.8 billion business volume in 1954, is still developing off-trail new markets. Latest is a \$400 depth recorder, originally designed for small boats, to measure volume of ore and coal piles.

Recent Shell Contracts Are For Specials

Despite a scattering of juicy contracts let within recent weeks and a host of rumors in the Midwest, there is no indication of an advance in military shell procurement. Reserve stocks of finished shells are strong, and any new contracts are for development of special projects, not for bulk buying of Army work-horse shell calibers.

Now You Can Specify Paint Systems for Steel

It's now possible to specify paint systems for protecting steel structures in the same manner as the steel itself is specified. Information is contained in a new volume climaxing four years of work by a noted research organization.

Small Mills for Far West Discussed

Two small semi-integrated steel mills for the Far West, using continuous casting of ingots after an electric furnace, have been in the talking stage for over a year. Investment costs, lack of stabilization of scrap prices are holding the projects back, it is claimed.

Ductile Iron: Bar and Rod Next

Ductile iron producers are getting ready to manufacture reinforcing rod, fence post and

screw machine stocks. Engineers are now working on plans to continuously cast the iron, then finish it into the three products on inexpensive reduction mills at major cost savings.

Cleanliness More Important

Modern automatic machinery places a premium on part cleanliness not previously necessary or recognized. Scale and sand inclusions in the skin of the casting cannot be tolerated in modern high-speed, precision machinery. In the next decade look for increased emphasis on part cleanliness by engineers.

New English Shell Mold Machine

Shell molds 13 in. high and 13 in. deep can be produced at a rate of 40 molds per hour on a new English shell molding machine. Push button dump box reversal and automatic return are machine features.

Carmakers Wonder About Dealer Discounts

Large discounts offered by automobile dealers in most sections of the country are causing some concern at the manufacturing level. Sales figures are excellent, but automakers wonder what will happen later in the year when selling gets tough.

Selling Below Cost May Soon Be Legal

Selling goods below cost may be entirely legal, a government rule now being written will make clear. Federal Trade Commission, preparing this rule, will show that such sales must be based on a "wrongful" purpose before they can be judged illegal.

Long Lived Bearing Metal Produced

A copper-lead emulsion bearing metal recently tested shows 100 pct self-healing qualities with either dry or lubricated operation at temperatures exceeding 1900°F without galling or seizing, it is reported. Suspension of 10 micron diam particles of the new metal with oils or greases gives bearing surface qualities nearly identical to that of the pure metal.

SIMONDS Shear Knife SELECTOR CHART

helps you pick the **BEST**
for your job!



RED STREAK

FORGED ROTARY SHEAR KNIVES

SIMONDS
SAW AND STEEL CO.

FITCHBURG, MASS.

Name and Number of Knife	For Shearing	Max. Thickness in Thousandths
High Chrome Steel		
Hot Rolled 150	Hot Rolled Steel	.150"
Hot Rolled 250	Hot Rolled Steel	.250"
Cold Rolled 100	Cold Rolled Steel	.100"
Cold Rolled 200	Cold Rolled Steel	.200"
Tin Plate 50	Tin Plate	.050"
Non-Ferrous 65	Non-Ferrous Metals	.065"
Non-Ferrous 100	Non-Ferrous Metals	.100"
Special Alloy Steel		
Hot Rolled 100	Hot Rolled Steel (40 Carbon or under)	.100"
Cold Rolled 65	Cold Rolled Steel (40 Carbon or under)	.065"
Cold Rolled 150	Cold Rolled Steel (40 Carbon or under)	.150"
Non-Ferrous 100	Non-Ferrous Metals	.100"
Non-Ferrous 150	Non-Ferrous Metals	.150"
Non-Ferrous 200	Non-Ferrous Metals	.200"
Non-Ferrous 375	Non-Ferrous Metals	.375"
High Speed Steel		
Hot Rolled 20	Hot Rolled Steel (5% Silicon)	.020"
Hot Rolled 40	Hot Rolled Steel (2% Silicon)	.040"
Cold Rolled 20	Cold Rolled Steel (5% Silicon)	.020"
Cold Rolled 40	Cold Rolled Steel (2% Silicon)	.040"

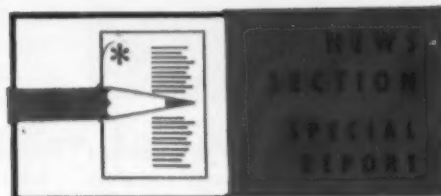
EXAMPLE: If you are shearing 20 Carbon Cold Rolled steel, .125" thick, you should specify High Chrome 200 knives. Since your material is less than 40 Carbon, Special Alloy Cold Rolled 150 knives could be ordered, but this type of knife will not stay sharp as long as High Chrome knives.

Whether you're shearing hot or cold rolled steel, tin plate or non-ferrous metals . . . separately or in gang slitting operations . . . Simonds tailors a "Red Streak" Rotary Shear Knife specifically for your application. Made in 3 different Simonds own electric furnace steels, these job-engineered knives give you cleaner, higher quality slitting . . . and longer service between sharpenings.

Forged for maximum strength and resistance to wear, as well as to prevent nicking or breaking out under shearing pressure, "Red Streak" Shear Knives are precision ground to close tolerances and a low micro-inch surface finish.

These are all "reasons why" Simonds Shears give better results in the long run . . . why it will pay you to send for the free "Shear Selector Chart" and to place your next Shear Knife order with Simonds.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
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Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada



PIPELINES: Will Boom Plate Market

Authorized and planned oil and gas lines will take thousands of tons of linepipe . . . Estimate electricweld demand at 1.5 million tons per year for the next 5 years . . . What's planned—By J. B. Delaney.

◆ **INSATIABLE** public demand for gas and oil will help keep steel order books filled for some years to come.

There is feverish activity on the pipeline front these days. Pending and authorized projects add up to tremendous tonnages of linepipe business for producers. Even if some proposed lines fall by the wayside, the outlook is still good.

A major pipeline will consume thousands of tons of seamless and electricweld pipe. Weight of a 30-in. line runs 262 tons per mile; a 36-in. line requires 315 tons per mile.

While there is some overlapping

between seamless and electricweld, consumers generally will specify seamless up to 26-in. OD, and electricweld from 26-in. to 36-in. OD.

To business-hungry producers of plate for linepipe, electricweld is like manna from heaven, since it is produced from plate. Plate mills already are beginning to feel the effect of requirements for projects expected to get underway late this winter and in early spring.

Demand for linepipe at the moment is not strong. But backers of several big lines have tentatively reserved space for later delivery. And producers look for the market

to become extremely tight beginning in March and continuing through the summer months.

This year could be one of the biggest for linepipe producers—the beginning of a resurgence following 2 years of comparative decline in demand. The first big post-war push in pipeline construction started in 1948 and continued through 1952. Prior to that, the so-called "Big Inch" and "Little Big Inch" lines, spurred by war-time requirements, kept linepipe mills busy.

Major linepipe producers look at the future with a great deal of confidence. One company estimates conservatively that demand

What's the Pipeline Outlook

	LENGTH (Miles)	DIAM. (In.)	TYPE	ORIGIN-TERMINUS	EST. COST	STATUS
American Louisiana Pipe Line Co.	1289	22, 30	Gas	La.-Mich.	\$130 million	1172 miles conditionally authorized
American Pipe Line Corp.	1425	24, 26	Products	Texas-N. J.	\$170 million	Planned
Anadarko Basin Pipe Line Co.	525	24	Gas	Texas-Tenn.	—	Planned
Ar-Mex Pipe Line Co.	900	8-12-14	Crude	Wyo.-Ariz.	\$ 31 million	Planned
Colorado Interstate Gas Co.	365	22	Gas	Wyo.-Colo.	\$ 23 million	Authorized
Colorado Western Pipe Line Co.	708	—	Gas	Colo.-Colo.	\$ 30 million	Planned
	328	16, 18	Gas	Colo.-Colo.	\$ 22 million	Authorized
Houston Texas Gas & Oil Co.	1542	—	Gas	La.-Fla.	\$148 million	Proposed
Nat. Gas Pipe Line Co. of America	479	20, 26	Gas	Tex.-Tex.	\$ 32 million	Planned
Northern Natural Gas Co.	403	24, 30	Gas	Can.-Minn.	\$ 33 million	Planned
Pacific Northwest Pipe Line Corp.	1466	—	Gas	Colo.-Pac. N. W.	\$160 million	Approved
Progress Pacific Pipe Line Co.	1100	24	Crude	Tex.-Calif.	—	Planned
Tennessee Gas Transmission Co.	243	24	Gas	Pa.-Conn.	\$ 27 million	Approved
Trans-Canada Pipe Line, Ltd.	2240	30, 36	Gas	Alta.-Can.	\$297 million	Approved
Transcontinental Gas Pipe Line Corp.	173	30, 36	Gas	—	—	—
	58	12, 16	Gas	—	\$ 30 million	Approved
Triangle Pipe Line Co.	560	12	Products	Ark.-Ky.	\$ 24.5 million	Proposed
West Coast Pipe Line Co.	960	24, 26	Crude	Tex.-Calif.	\$106 million	Planned

SPECIAL REPORT

over the next 5 years will average 1.5 million tons annually for electricweld pipe alone—a comforting prospect for plate producers as well.

Two of the biggest pipeline projects in history are scheduled to get underway this spring.

The Trans-Canadian Line is a 2240-mile project that will stretch from Southern Alberta to Montreal. The \$297 million undertaking will require thousands of tons of 36, 30, and 24-inch linepipe. Most of it will be supplied by U. S. producers and the remainder will come from Canadian mills and imports from Europe. Construction will begin this spring,

with completion target date set for Nov. 1, 1956.

Another whopper due to get started early this year is a 2600-mile big-inch line that will bring Canadian gas to California and pave the way for serving the Pacific Northwest with gas from southwestern U. S. When completed, the line will form a bridge of interlocking lines tying in all major consuming areas west of the Rockies with all the big gas-producing areas in the western half of the continent.

Biggest In History

The latter project is referred to as "the biggest gas-transmission project in history." It will involve an outlay of close to \$400 million and will have a potential capacity of 1 billion cubic feet of gas per day.

U.S. Linepipe Production

(Thousands of Tons)

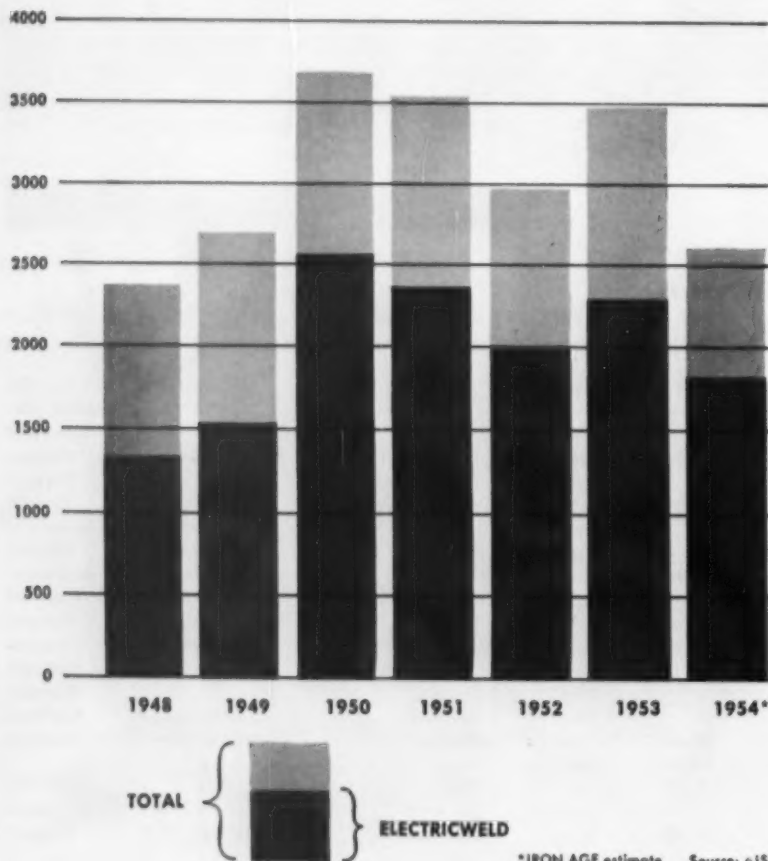


Plate:

Market shows strength . . . Lead time stretches.

The stage was set last week for a tight March or April in steel plate. With a minimum 6000 miles of linepipe hanging fire, and a bill introduced last week that could pull the cork from this government stoppered bottle, plate fabricators were rechecking their stocks.

A quick check of plate consumers would indicate no alarm. Not yet. But here are the indicators:

(1) Procurement of plate by consumers had been sinking through 1954. Tonnages shipped from mills began to pick up in September. Without a smell of the 2400 miles of linepipe then discussed for letting, purchasing agents in tank fabrication, construction equipment, farm equipment, and (by October) carbuilding, began to order at an increased rate. By late December, 30-day inventories of steel plate began to push out. Industries like farm equipment that had let their traditional 60-day inventories of steel and components sink to 30 days during the slow months of latter 1953 and 1954, began to move out, returning to the old 60-day level.

Real Plate Strength Seen

(2) Mills were noting real plate strength. Deliveries were still excellent, running at a 4-week figure. But deliveries didn't give the entire picture. Not much more than one month ago, mills were able to take plate orders up until a week before rolling. Closing dates for one mill moved back to the 15th of the month previous for one producer. Two more, though the tonnage wasn't entered on the books as orders, had commitments sufficient to take up virtually all rolling space through April. A fourth was reducing field sales office allocations 30 days ago.

(3) Even though mill delivery times continue to run at 4 weeks, and give no evidence of the strength in the March-April outlook, the 4-week delivery is a considerable advance over January.

AFL-CIO: Merger Feather for McDonald

Joining of two unions is along lines proposed by McDonald . . . Reuther was cool on merger plan . . . Change won't affect steel labor relations . . . New union will carry more weight in Washington—By J. B. Delaney.

♦ **MERGER** of the American Federation of Labor and the Congress of Industrial Organizations will make little or no difference in steel labor relations.

The United Steelworkers of America will operate as an autonomous union within the framework of the merged organization just as it did as a member of the CIO.

David J. McDonald, USW president, whose stature in the national Labor movement was enhanced by the Miami Beach decision to merge labor's two biggest units after years of disunity and strife, will still call the turn in steel labor negotiations. No one in the combined labor group will have anything to say about that.

The proposed merger is another feather in Mr. McDonald's cap. He was one of the first CIO officials to advocate it. Last September, at the USW's convention in Atlantic City, he predicted labor unity would become a reality within a short time. Later, he talked of a merger in the year 1955.

Reuther Lost Ground

Mr. Reuther, CIO head, on the other hand, appears to have lost ground. Informed sources say that he was lukewarm toward the idea up to the last minute. The famous Reuther smile was apparent after the agreement to merge was announced, but it's not likely that his enthusiasm was as strong as it appeared.

As it turns out, the CIO will lose its identity. Mr. Reuther liked his job as president of the CIO. While he continues as head of the powerful United Autoworkers, he has lost the prestige and authority that went with the CIO presidency.

Meanwhile, the merged organization will represent a united labor front with more power and authority than at any time in the



LABOR CHIEFS George Meany, AFL Pres. (left) and CIO head Walter Reuther meet informally in Miami Beach prior to closed merger discussions. USW's Dave McDonald is seen gaining stature from amalgamation of unions.

history of the U. S. labor movement. It will be listened to more attentively in legislative halls at Washington and in state capitols. It will be able to do more to put down some of the worst blights that confront organized labor—racketeering and jurisdictional disputes.

Who's Who in Merger

The merger agreement is along lines advocated by Mr. McDonald in his September speech.

George Meany, president of the AFL, will head up the new organization. In line with its greater membership, the AFL will control the merged group's executive council by a 2-to-1 margin. William F. Schnitzler, secretary-treasurer of the AFL, will hold the same post within the combined organization.

In addition, the AFL will have 17 vice presidents, the CIO, 10. Reason for this is that the AFL brings 10.3 million members while

the CIO claims between 4.5 million and 5.0 million. An executive committee will be composed of Messrs. Meany, Schnitzler, and six vice presidents.

Approval of the AFL executive council and the CIO executive board is expected to be complete before end of February. Then a proposed constitution will be drafted and approved. A combined convention will put the final stamp of approval on the merger.

Rate Wage Proposal

Proposal to increase the minimum wage from 75¢ to 90¢ an hour would add \$234 million a year to the straight-time wages of 1.3 million workers, the Labor Dept.—one of the principal boosters of the hike—says.

Secretary of Labor James P. Mitchell estimates that 1 million of the workers to receive a raise would be in manufacturing.

URANIUM: Room for More

Ore output still tops processing capacity . . . AEC guarantees market, helps with tax breaks . . . It's a potential new equipment market—By N. R. Regeimbal.



GRINDING URANIUM ORES. Low concentration of uranium in domestic oil shales and lowgrade carnotites demands large quantities of raw materials.

♦ THERE IS A SERIOUS need for additional uranium ore processing facilities in the West—but there are plenty of pitfalls awaiting the prospective member of the new industry. Similarly, there is a good market for manufacturers of milling machinery and chemical processing equipment.

Guaranteed prices and liberal production bonuses have sent hordes of eager prospectors swarming over—and sometimes into—the Colorado Plateau in search of uranium ore. They've been so successful that ore is turning up at ore-buying points faster than existing mills can treat it to produce concentrates acceptable to the Atomic Energy Commission.

Natural deduction is that, with the Government eager to buy and concerned about building up local sources of supply for a war emergency, uranium processing is a

good place to invest a million dollars or so of surplus funds. However, discussion with AEC officials indicates that prospective investors should study the field carefully before venturing into uranium processing.

There are two basic methods of treating Western uranium ores—acid leach and alkaline leach. But the processes for extracting a uranium salt (U_3O_8) from uranium-bearing sandstone, limestone and other types of ore in which the precious fissionable material is found vary considerably.

Each mill must be equipped to deal with ore from a number of small, but usually similar deposits, although one large deposit may be the principal supplier to the mill. A potential processor had better make arrangements to insure a fairly constant ore supply.

Many of the early uranium mills

are converted vanadium mills, and still recover both uranium and vanadium. In other cases, the type of ore processed makes it almost mandatory that the plant recover both materials. In some instances, however, the mill operator finds it better to ignore vanadium.

For the most part, equipment used by the processing plants is standard. In addition to conventional mill machinery—conveyor belts, crushers, screen, etc.—the mill must have a substantial investment in chemical equipment.

AEC is now negotiating with several potential new mill operators, but even if they all come to fruition, there will still be plenty of room for new entries. Some plants have been granted fast-tax amortization certificates from the Office of Defense Mobilization. AEC contracts to purchase a stated output from the mill at a negotiated price, which varies according to operating cost, overall recovery and plant capital charges. Present AEC contracts endeavor to assure a supply of uranium concentrates through 1962.

It's 10 Years Away

Because of the need for high recoveries of uranium from ore, AEC is not inclined to negotiate contracts unless a prospective producer has plenty of "know-how" in the chemical-metallurgical field.

In November, the Kerr-McGee Oil Industries, Inc., placed a processing plant in operation at Shiprock, N. Mex. An expansion of the Vanadium Corporation of America's Durango, Colo., plant was completed in October, and an expansion is now underway at the Grand Junction, Colo., plant of the Vitro Uranium Co. Anaconda Copper Mining Co. is building a large new plant at Bluewater, N. Mex., and expanding present facilities in the same area. Other producers include U. S. Vanadium Co. and Climax Uranium Co.

Some mill operators are looking hopefully at the day, estimated at least 10 years distant, when commercial nuclear power will come into its own, and the first real commercial markets for uranium processing equipment will also come into its own.

STEEL: New Alloys Look Good

Research firm brings out "Super Rustfree" steels . . . Lab tests show high strength, good corrosion resistance . . . Compare well with alloys using higher alloy content . . . Name distributor—By R. L. Hatschek.

♦ A NEW LINE of alloy steels showing excellent physical and corrosion properties is now being marketed. Called Super Rustfree Steels, or SR Steels, they were developed by Karl Spitz, vice-president of Uniworld Research Corp. of America, and will be sold through distributors.

They are being produced for Uniworld by two electric furnace steel producers and plans are to add more in the near future.

Special Purpose Steels

First distributor named by Uniworld is Eastern Brass & Copper Co. which has exclusive rights in the Metropolitan New York area. Others will be named to handle the SR steels in other areas.

Fields of application envisioned for the fully austenitic SR steels, which also exhibit good high-temperature properties, include: chemical equipment, furnace and pickling equipment, gas and steam turbines in addition to others. The SR steels are in the special purpose category.

So far only experimental parts have been made of these alloys, which are currently available in

sheet, plate, rod, wire and tubing. Casting and forging varieties are also available.

Alloy currently available in wrought form designated IIA-1132, has the following analysis: Nickel 13-15 pct, chromium 11-13 pct, molybdenum 6-7 pct, copper 5.5-6.5 pct, smaller quantities of manganese, and carbon up to 0.12 pct. Remainder is iron. Mr. Spitz attributes the merits of the alloy to the relationships of the alloying elements not the percentage.

Prices are somewhat higher than stainless steels, though less than many of the "super alloys." Sheet base price, for instance, is \$1.50 per lb.

As to its machineability, Mr. Spitz says it does not differ widely from commonly used stainless steels. In cold-drawing wire of the IIA-1132 alloy, for instance, the cross-section can be reduced some 93 to 97 pct (in successive operations) before it must be annealed. Tubes currently available are being hot-extruded by the Sejournet process at Babcock & Wilcox Tube Co.

Hot-working of SR steel is admittedly difficult on present pro-

duction equipment. However, it is far from impossible and presents less trouble than many of the high alloys and some of the stainless grades, according to Mr. Spitz.

In the fully-annealed condition, alloy IIA-1132 has an ultimate tensile strength of 95,000 psi and a yield strength (2 pct offset) of 75,000 psi. This compares with annealed 18-8 stainless tensile strength of 75,000-80,000 psi and yield strength of 35,000-40,000 psi. At 1200°F the IIA-1132 has a tensile strength of 57,000-63,000 psi; at 1350°F it is 50,000 psi; at 1500°F, 32,500 psi.

For even hotter jobs, the UST alloy, available only in castings as yet, has a tensile strength of 33,800 psi at 1600°F. This alloy contains 20 pct nickel, 20 pct chromium and a total of less than 10 pct copper and molybdenum.

The standard SR casting alloy, IIA-1121, has the following room temperature properties: Tensile strength 112,400 psi and yield strength 44,300 psi. Comparable strengths for cast 18-8 stainless are: Tensile 70,000 psi and yield 28,000 psi; for cast 25-12 stainless the figures are 70,500 psi and 40,000 psi.

Corrosion Properties

Comparative loss in tests made by a leading steel mill.

	13 pct salt-sulphuric acid solution at 180°F	18 pct nitric acid at room temp.	18 pct nitric acid at 160°F	4 pct hydrofluoric acid-6 pct nitric acid mixture at 110°F
ALLOY "A"	3150 units	32,000 units	completely dissolved	completely dissolved
ALLOY "B"	1900	63	328	1500
SR STEEL	1200	25	146	1300

Each unit represents a weight loss of 1 gram per sq cm of surface area in 144 hours.

Compositions (pct of alloy content)
ALLOY "A" ALLOY "B" SR STEEL

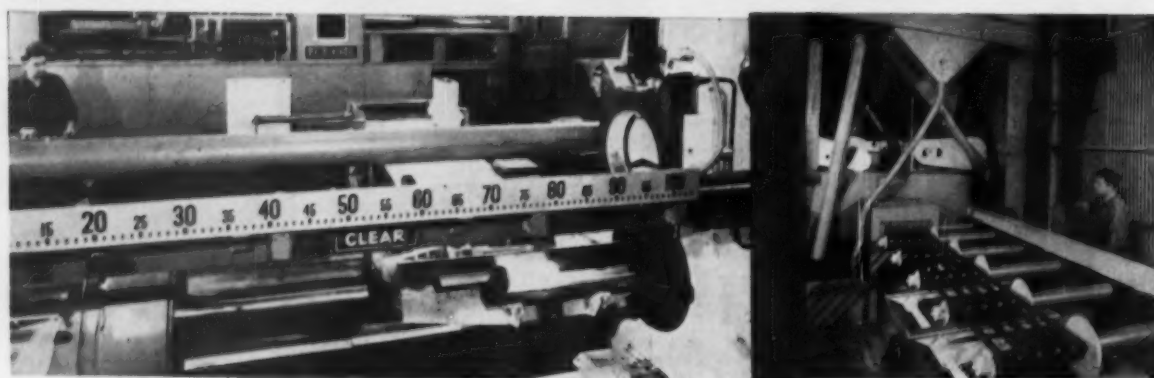
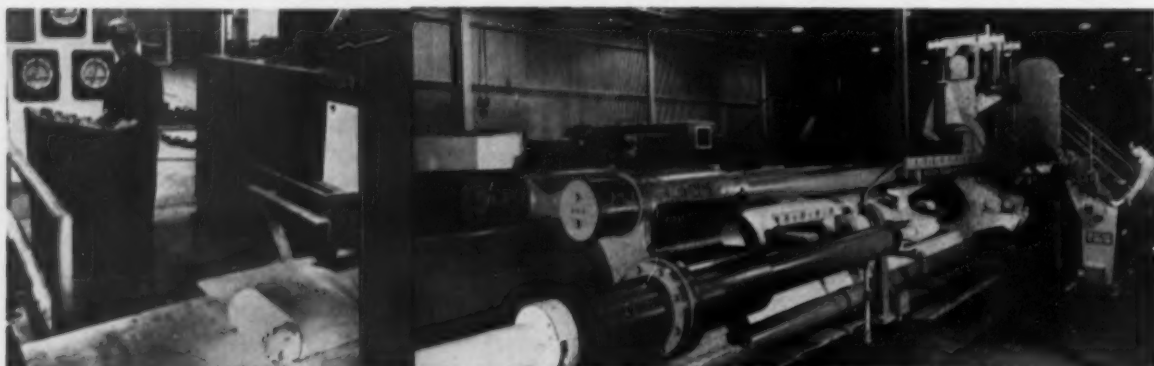
Chromium	23	12
Nickel	65	52
Molybdenum	30	4
Copper	6	6.5
Tungsten	2	

J & L Hot Extrudes Steel

Produce solid sections by Sejournet process . . .

Concentrate on carbon steel, not alloys . . . Cheaper for short run items . . . How it's done—By W. G. Brookfield.

- 1 BILLET is heated to 2300°F in 1 minute, then rolled through glass powder which lubricates die.
- 2 PRESS capacity is 1000 tons. It's used to extrude complex shapes.
- 3 RAM (left) is moving toward billet which it will squeeze through die.
- 4 EXTRUSIONS are straightened, shot blasted five at a time in this machine, then cold-drawn to final size.



3

♦ ANOTHER American steel company is producing hot extrusions under a licensing arrangement with a French firm. Jones & Laughlin Steel Corp. has announced it is producing solid steel sections by the Ugine-Sejournet hot extrusion process.

Other companies licensed to use the Ugine-Sejournet process include: Babcock & Wilcox Co., Allegheny Steel Corp., National Tube Div. of U. S. Steel, H. M. Harper Co., International Nickel Co.

J & L is the first to concentrate on production of carbon steel sections. Other licensees have largely emphasized stainless and other spe-

cialty steels, including tool steels.

At the start, J & L will produce extrusions in solid sections, ranging in weight from 0.33 to 12 lb per lineal foot, and up to 24 ft in length.

Main production will consist of complex sections which cannot be rolled, plus small tonnages of rollable special sections which are not economical to roll.

J & L will use a 1000-ton Loewy-Hydropress extrusion press designed to its specifications.

The company uses hot-rolled rounds cut to billets ranging from 4 in. diam and 6 in. long to 5 in. diam by 20 in. long, with a maxi-

mum weight ranging up to 110 lb.

Billets are heated in a Magnethermic induction heating unit in an inert gas atmosphere. The billet is heated to 2300°F in 1 minute. After heating, the billets roll through powdered glass which acts as a die lubricant.

The billets are transferred automatically to the loading end of the extrusion press. After extrusion, the bar is cooled, then stretcher-straightened and de-twisted. An American Wheelabrator shot-blasting machine cleans glass and scale from the bar. For close dimensional accuracy and fine finish the bars are cold-drawn.

4

AUTOS: Many Detroit Plants Go Idle

Changing automotive economics idles many Motor City plants . . .
Obsolescence, lack of business, mergers, decentralization are contributing
factors . . . Cite case histories—By R. D. Raddant.

♦ MILLIONS of square feet of automotive manufacturing space lie idle in Detroit today, waiting for purchase, dismantling, or the vague hope that future business may restart their dust-gathering conveyors.

Signs above the vacant buildings proclaim ownership by Hudson, Packard, Lincoln-Mercury and Murray Corp. of America, not to mention many other smaller plants that have moved, consolidated, or closed up because of the changing economics of the automotive industry.

Reasons for the number of plants that are in disuse vary from company to plant. Some buildings are idle because of obsolescence, others from pure lack of business, and still others as a direct result of merger activity that took place in the past year.

The former Lincoln-Mercury plant on West Warren Ave., for example, gave way to a combination of decentralization and modernization. Although its 5-story office building still houses Lincoln-Mercury administration, its 1,200,000-sq ft manufacturing and assembly plant is completely idle. Conveyors, paint ovens and other facilities have been dismantled.

Plant Too Old

It was built in 1918 by the Lincoln Motor Co. which was purchased by Ford in 1922. Assembly of Lincoln and Mercury cars was discontinued in 1952 when all Detroit L-M assembly operations were transferred to a new plant at Wayne, Mich., some 30 miles west. In addition to its Michigan plant, L-M has assembly plants in New Jersey, St. Louis, and Los Angeles.

No plans have been announced for the old plant, presumably the

victim of obsolescence. The division apparently found it more practical to erect a new assembly plant than operate an old one.

At the Packard plant on West Grand Blvd., another 1,200,000 sq ft of plant space lie idle and the entire area south of the intersecting boulevard has been offered for sale.

Packard Moved Out

This vacancy is caused by a combination of giving way to more modern facilities and consolidation of operation. Packard bodies were formerly built by Briggs, which was purchased by Chrysler a year ago. Packard then leased the Conner St. plant from Chrysler and also transferred assembly operations to the new plant. Packard in this way took on a complete

new operation, but moved from old facilities at the same time.

Less encouraging is the story at Hudson. This former big employer in Detroit now makes only Hudson engines in the Motor City. All other operations have been transferred to Wisconsin plants of American Motors.

The Hudson Special Products Div. of American has the job of developing products, possibly for defense, to utilize the four plants. Outlook is gloomy, however, and American has indicated it would listen to a proposal for sale of plant space.

Only a few months ago Murray Corp. of America announced it was going out of the auto body business because this function has been taken over by just about every automaker.

		January	
		1955*	1954
BY TYPES	Net Tons	% of Capacity	Index†
TOTAL	8,838,000	82.7	124.2
	7,951,486	75.3	111.8
Openhearth	8,055,000	86.0	125.8
	7,256,526	78.3	113.3
Electric	584,000	63.6	163.3
	434,507	48.9	121.7
Bessemer	199,000	48.9	56.6
	260,453	64.0	74.1

Source: AISI *Preliminary Figures

†Index of production based on average production of the three years 1947-1948-1949.

**“Maybe we’d better
scrap some of our
ideas about scrap?”**

**This may
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solution**

Cracks in parts are one main cause for scrapping. When these cracks are not discovered until after machining or at final inspection, time spent in processing the parts is a dead loss!

Inspection with Magnaflux’ Methods finds all cracks—from whatever cause—at any stage of manufacture. By finding cracks early you can correct the

Do YOU think of your scrap in terms of material costs only? Actually it’s the time and labor that have been wasted upon it that is really costly.

Accepting an arbitrary rejection rate as inevitable, is expensive and usually unnecessary. The solution is often so simple it can be easily overlooked.

cause before parts are run in quantity. Result: almost no time or money is wasted on defective parts.

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ENGINEERS: Supply-Demand Gap Grows

**Civilian industry needs 35,000 new engineers every year . . .
But the universities graduated only 20,000 last year . . . And the Reds
are gaining, with 54,000 new engineers in '54—By K. W. Bennett.**

◆ **HOW CRITICAL** is our need for technical manpower?

Industrial and military leaders at Chicago last week called the situation dangerous and indicated that it is growing more so. More than 35 top ranking industrial and military men pulled no punches in examining the problem before 2500 attendees at the nation's first conference, of this magnitude, on proper utilization of our technological manpower.

The peacetime economy can absorb 35,000 engineers per year and about 4500 scientists. But after graduation in 1954, there were only 20,000 new engineers available, and it is expected that for the next 10 years the total number of graduates yearly will hang near the 30,000 mark. This is despite the fact that peacetime requirements for engineers have been doubling every 10 years, and soared tenfold during the war years.

One company was prepared to take an entire MIT graduating class. Another is currently seeking 300 engineers, another 400. An extreme, but indicative case, was the turnout of recruiters from 110 companies seeking interviews with the 15 graduating civil engineers of the 1954 Louisiana State University class.

How critical is our military need? Of the Corps of Engineers, 85 pct of its active manpower is in the reserve. Of these, taking the rank of Captain as an example, only 6 pct are engineers.

The U.S.S.R. attained 54,000 engineering graduates in 1954, compared with 20,000 in the U.S.; and that nation granted the equivalent of a doctor's degree to 8700 candidates compared with less than half that number here. This country needs at least 4500

scientists at the doctorate level yearly, and isn't getting them.

H. H. Tryten of the National Research Council believes that a national emergency might boost this nation's technical manpower requirements by 30 to 50 pct. Such a surplus doesn't exist.

At present, the situation isn't improving. Since 1920 the number of engineering degrees granted per 1000 of population has tripled, but at the same time the number of business-and-commerce degrees granted has multiplied by seven times. President John T. Rettaliata of the Illinois Institute of Technology believes we will have 23,000 engineering graduates in 1955; 30,000 in 1956; and 34,000 in 1957. The figures don't compare well with the 41,000 graduates of 1951; 31,000 in 1952; 24,000 in 1953; and 20,000 in 1954. Particularly when the U.S.S.R. figures rose from 30,000 in 1951 to 54,000 in 1954.

Urge Correct Placement

Before putting long range programs into effect, the military-industrial conference was trying to put out a fire. Recommendations for the new draft law that will be enacted by Congress in June should come from the conference, urged Robert Wilson, chairman of Standard Oil of Indiana, and Society of American Military Engineers president Lennox Lohr. First, they said, see that technically trained men who are subject to draft be put in jobs that will utilize their badly needed skills; not be placed, as has happened in the past, at the operating handle of a mimeograph machine or pounding the company headquarters typewriter.

At week's end, the conference was seeking means to make technological training more available

and desirable, starting back at the high school level; means to boost the strength of our teaching force, which is particularly understaffed in the sciences; means to spare graduate students who still may be pulled from their studies.

The Chicago conference sponsored by the Society of American Military Engineers focused some of the nation's top brain power on a critical military and industrial problem. This was the start. Now we need time.

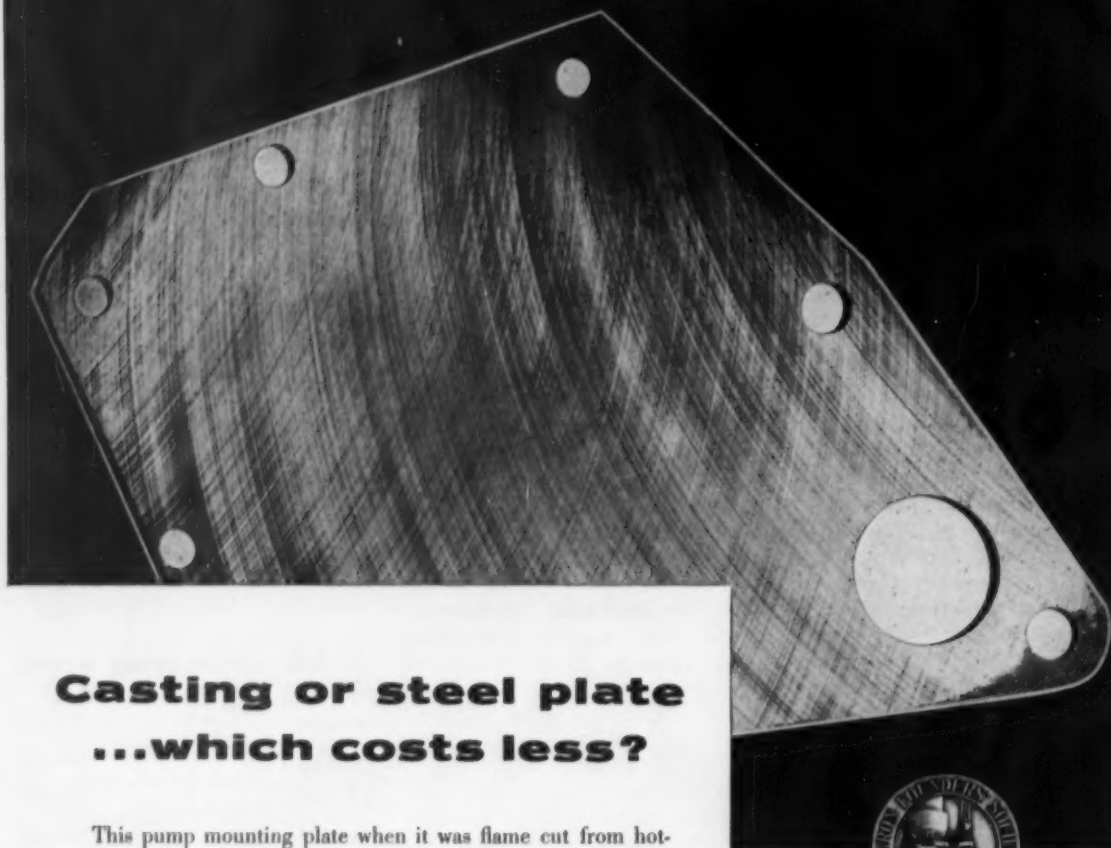
U.S. Engineering Grads

1954-55	23,000
1955-56	30,000
1956-57	34,000
1957-58	29,000
1958-59	29,000
1959-60	31,000
1960-61	31,000
1961-62	31,000
1962-63	32,000
1963-64	35,000

International Box Score

	U.S.	U.S.S.R.
Total Engineers	600,000	500,000
Total Scientists	200,000	200,000
Engineering Graduates		
1951	41,000	30,000
1952	31,000	30,000
1953	24,000	40,000
1954	20,000	54,000
Total	116,000	154,000

Gray Iron mounting plate, for use on a water circulating pump, was cast to shape with holes cored.



Casting or steel plate ...which costs less?

This pump mounting plate when it was flame cut from hot-rolled plate and drilled, cost \$1.92.

Then it was redesigned in Gray Iron

Now it costs \$1.33 . . . a saving of 30%. The holes are cored and the only finishing on the casting is surface grinding on both sides.

Economy is only one reason for redesigning parts in Gray Iron. This versatile metal can give you strength, rigidity, wear and corrosion resistance . . . and many other unique engineering advantages.

Call your nearest Society member foundry and the full facilities of this association will be available to help you. Or, write direct to Gray Iron Founders' Society, Inc., National City-E, 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

MAKE IT BETTER WITH GRAY IRON



This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

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- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

GRAY IRON FOUNDERS' SOCIETY

Tools:

Army salts away machines in Kansas caves.

The Army will soon more than triple the size of the subterranean vault in which it is interring multi-million-dollar stocks of machine tools for use in any new emergency.

For almost 2 years, Army officials have been collecting unused machine tools from former defense plants, cleaning and oiling them, and squirreling them away in a 15-acre cave near Atchison, Kan. Some new tools are also included. The cave, a mammoth cement-lined mausoleum with humidity mechanically stabilized at 30 pct, was originally leased and equipped by the Commodity Credit Corp. for storage of surplus food.

Defense officials now propose to buy this cave and an adjoining cavern of 36 acres, which will bring the total floor space of the underground warehouse to 1.5 million square feet. Price of the purchase is not disclosed pending congressional approval expected soon.

Still Need Approval

The project, first such underground stockpile project for other than foods, has been authorized by Congress, but approval of the purchase contract is still needed.

Plans for turning the new burrow into an acceptable warehouse call for cementing the floor, reinforcing the ceiling, installing air conditioning and dehumidifying equipment, and running a railroad spur line inside the vault.

Ceilings on the caves average about 12 ft, with from 30 to 100 ft of rock and earth serving as a natural bomb-resistant ceiling over the entire warehouse.

One Defense Dept. spokesman says the tools could be moved out of the cave and installed in plants before industry contractors would have the raw materials and manpower needed to start up their production lines.

The Army expects to get full approval and title to the two caves within 2 or 3 months, and have the second cave ready for use within another year.

DEFENSE



TAKEOFF with one prop feathered is a snap with a pair of 1000 lb thrust turbojets on wingtips of C-123B assault transport. Augmenter jets are J44's built by Fairchild Engine and Airplane Corp. They boost rate of climb—with one engine off—from 150 fpm to 500 fpm. Jets are only 72 in. long, 22 in. in diameter; burn regular aviation gas.

Missiles:

Long-range guided weapons are seen for near future.

High-speed delivery of mass destructive forces close to the heart of any nation which goes to war against the U. S. may soon be possible.

The container which will carry these shattering contents is the intercontinental ballistic missile, a weapon that will travel with meteorlike swiftness and controlled accuracy. Its planned warhead is the hydrogen bomb.

Though the Navy and Army are prepared to use certain types of missiles for air defense and for certain attack missions, the Air Force alone is to handle surface-to-surface missiles on a strategic basis. The three known to be taking shape in the hands of aircraft companies are the Snark, Navaho, and Atlas.

Barring unforeseen hitches, the proving area for these and perhaps other missiles for long-distance firing will lie between the Florida coast and the Ascension Islands in the South Atlantic. When the question of using the British property as the terminal point is settled, the course can be laid out.

Providing improved guidance

systems is one of the most serious problems in building missiles. Best bets for long-range guidance are the inertial system and the celestial, or star-steering method.

In the field of short-range missiles, the Army, Navy and the Air Force all are stocking a variety of hard-hitting units for defensive and offensive action against airborne and fixed targets.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Trucks, fork lift, 420, \$1,698,484, Towmotor Corp., Cleveland, Ohio.
Compressor, air, portable, 90, \$207,600, Ingersoll-Rand Co., Washington, D. C.
36' landing craft L CVP (wood), 472, \$3,611,267, Shelburne Harbor Ship & Marine Construction Co., Inc., Shelburne, Vt.
Stand, test, hydraulic system, 762, \$3,050,262, Sun Electric Corp., Chicago, Ill.
Airspeed indicator, pressure transmitter, 2553, \$742,461, Kollman Instrument Corp., Elmhurst, N. Y.
Wheel assy, brake assys, 3253, \$1,585,627, Goodyear Tire and Rubber, Akron, Ohio, *C. D. Smith*.
Periscope, M-19, 2461, \$522,962, Eastman Kodak Co., Rochester, N. Y., *H. B. Collins*.
Aiming circle with spare parts, 5260, \$1,149,352, ANSCO Division General Aniline & Film Corp., Binghamton, N. Y.
Replenishment of comm. vehicles, 258, \$1,855,905, International Harvester Co., Washington, D. C.
Rafts, 1268 ea, \$215,484, Rubber Fabricators, Inc., Grantsville, W. Va.
Cup case brass for etc, cal .30, 2250000 lbs, \$997,875, Chase Brass & Copper Co., Waterbury, Conn.
Automatic degaussing control equipment, 203, \$604,902, Vickers Electric Div. St. Louis, Mo.
Trailer, fire control van, 96, \$1,468,800, Fruehauf Trailer Co., Detroit, Mich.
Tank oil coolers, 7660, \$710,728, Continental Motors Corp., Muskegon, Mich.

34 design ideas in Stainless Tubing from *Carpenter*



Your immediate problem may be a structural part for a machine, a component for an appliance, an architectural application to combine function with decorative value—but whatever it may be, there's an idea here for you.

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Carpenter offers *scores of stainless tubing shapes* in a wide range of dimensions, analyses and finishes as standard production. From them you may be able to select one that will do the job you have in mind. If, however, a "special" is required, *Carpenter can produce it* in any desired quantity—almost any type of finish.

Why not find out more about Carpenter Stainless Shaped Tubing and its possible place in your product designs. Call your nearest Carpenter distributor or branch office for "in-shop" consultation, or write direct to...



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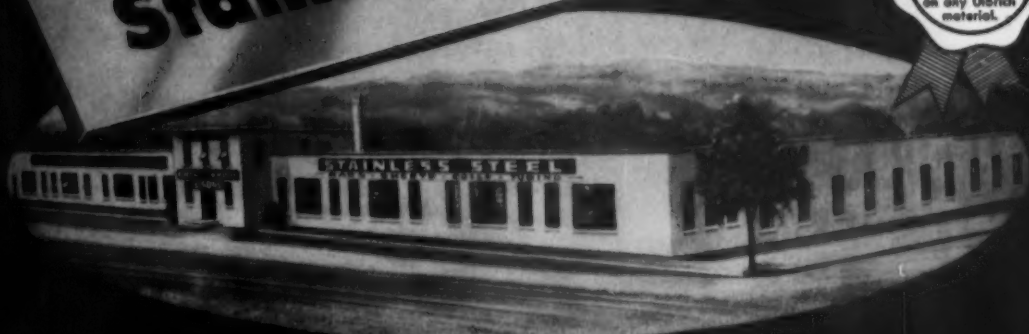
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Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"




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Engineering:

Sees new plants for chemical and petroleum makers.

Prospects for expansion in the steel and petroleum industry this year look "very promising" according to a leading engineering firm.

H. R. Moorehouse, secretary-treasurer of Arthur G. McKee & Co. of Cleveland, last week told security analysts there, "We have quite a few inquiries from iron and steel companies on hand for bidding. They are coming in at a pretty high rate. It looks like they're going to spend more money this year."

Sees Large Market

In the petroleum field, Mr. Moorehouse said, "The industry is getting into an octane race. Although many people feel they don't need 98 octane gasoline any more than they need a hole in the head, we currently have 12 new inquiries on construction of huge refineries in the field. One would cost between \$30-35 million and have 1.5 million bbl per day capacity."

Rapid technological progress is also boosting the replacement business. The average age of obsolescence is now about 7 years, he said.

Although the McKee company is a leading blast furnace builder and also designs and builds integrated steel mills, the firm is currently eyeing the chemical and non-ferrous industry for new opportunities to build.

Going Full Blast

Production of Wheeling Steel Corp. has been averaging better than 97 pct of capacity since the first of the year, according to J. H. McElhinney, operations vice-president.

Blast furnace at the Benwood works is being readied for production and should be operating very soon. The other 5 blast furnaces

of Wheeling Steel, located at Steubenville and Mingo Junction, Ohio, are continuing in operation. The 10 openhearth at Steubenville and bessemer steel-making facilities at Mingo Junction are operating at practically capacity.

Production schedule for making pipe at the Benwood works is expected to be reduced during the week of Feb. 7. The 2 continuous-weld furnaces and the skelp mill are expected to operate 3 days compared to the 5-day operating rate during the previous week. The Yorkville works is expected to continue at near-capacity production of tinplate and ternplate.

Production:

Northeastern Steel adds two 35-ton electric furnaces.

Although details may not be completed Northeastern Steel Corp. is reported to be starting on an expansion program that will include two 35-ton electric furnaces plus rolling, grinding and cold drawing equipment for standard and bar, stainless and alloy steel. New furnaces would give Northeastern a capacity of 10,000 tons per month which would be added to the 15,000 tons a month now coming from openhearth.

The company expects to be operating at 100 pct of capacity for the rest of this quarter and has recalled 150 employees. Other developments with the company include establishment of Bridgeport as the price base and the placing of openhearth production on 7-day week basis.



"Looks like a rough night!"

Build Brass Mill

American Brass Co. plans to build a brass mill in Los Angeles and a flexible metal hose and tubing plant at Mattoon, Ill. Construction will start this year.

Cost of the brass mill is estimated at \$13 million; annual capacity will be 15,000 tons of copper and copper-base alloys. The Mattoon tubing plant will cost \$2.5 million and will cover 86,000 sq ft.

Adds New Site

Robertshaw-Fulton Controls Co., through its recently opened Long Beach, Calif., Grayson Div. plant, will be able to double present output of thermostatic controls and ignition devices for gas heating appliances. The \$3 million Grayson plant approximately doubles in size the division's former location in Lynwood, Calif. A metals processing building is connected by ramp with the production area at the new site.

Set Expansion Record

The past year may not have set any auto production records, but it set a different kind of record—expansion of production facilities.

Automakers laid out \$1,350,000,000 during 1954 in a record expenditure on capital goods. And this figure does not include cost of special tooling.

Behind this expenditure is the conclusion that in the competitive market of today, old plants are not economical enough, old manufacturing methods are not competitive, and only modern facilities are good enough to produce the quantity, quality and low cost of production that conditions demand.

Will Buy U. S. Equipment

American-made equipment ranging from power shovels to wire-drawing machines will be bought by a Brazilian firm which plans to increase its steel production from 180,000 to 345,000 ingot tons per year.

To aid in financing the equipment sales, the Export-Import Bank of Washington has established a credit of \$730,440 on behalf of Cia. Siderurgica Belgo-Mineira, S.A.

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With rising labor and material handling costs in the production of refrigerator compressor housings, General Electric presented their problem to C.P.C.—Clearing Productivity Consultants. The result is the transfer-feed press shown above to produce top and bottom halves of the compressor housing at the same time. This

press replaces a conventional method involving several machines, a crew of men and considerable handling of material.

The new transfer feed press loads blanks into the stack feeder and automatically moves the parts from station to station as the press operates. Top and bottom halves of the compressor housing are completed

in alternate strokes by the red slide shown in the photo. From there they are transferred to the unloading station.

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Report To Management

What the Kremlin Shift Means

You can figure the Malenkov fadeout won't have much effect on U. S. defense spending nor on business activity (other than psychologically). Red experts in Washington were not as surprised by the Moscow power shift as press reports indicated—insiders have known for some time that Nikita Khrushchev and his supporters had a 5 to 4 voting edge over the Malenkov faction. Result is our defense budget was made out on the basic assumption that Russia would continue to be tough.

The one thing that might (though probably won't) change the defense budget will be efforts by the Democrats to use the Russian changes and the increasingly perilous Formosan situation as arguments for stepped up defense spending. But the odds are against this having any important effect on defense spending plans.

What the Kremlin personnel shift will mean is this:

(1) The nonsense about peaceful coexistence will be dropped. In this sense the changes in Russia's top brass may be a blessing for the American people. Had we kept our eye on Malenkov's elusive peace dove we might have been lulled into a false security, slowed up our defense production and been a setup for another Geneva conference.

(2) You can figure Red China will be tougher than ever. Defense Minister Zhukov and Party Boss Khrushchev are both "Red China Firsters," so if there has been any real split between Moscow and Peiping this will be lessened considerably.

(3) Demotion of Malenkov is a sign of the dissension that has been going on inside Red power circles since Stalin died. Squabble among Red bigwigs will continue until Khrushchev (or someone else) gains complete control. Most experts believe this means the Russians will take a breathing spell to settle their own internal

affairs before risking new international adventures.

But the best bet is this won't happen. If anything the Reds may become even more aggressive than they have been. Reason: A stepped up anti-Free World campaign will take the peoples' minds off the inner party conflict and the dissatisfaction that may result from Russia's switch to a "more guns less butter" economy.

Which Way the Red Wind Blows

But the much publicized change in the Red political hierarchy doesn't signal any really dramatic changes. For some time now the Reds have been putting more and more stress on the military. The shift from consumer goods to "heavy industry" is not a new development and the 12 pct increase in defense spending in Russia's '55 budget indicates the trend of Kremlin thinking.

Business Gets Better All the Time

Business continues to get better. Statistics and indexes always lag what's going on but they do indicate the direction and the current direction is sharply up. Here's the breakdown on some important indicators: (1) Steel production in January was up 11 pct over same month a year ago; (2) heavy construction contracts in December '54 were up nearly 58 pct from '53; (3) December auto output was 38.7 pct above '53; (4) electric power output increased 13.7 pct; (5) coal production rose 5.1 pct; (6) petroleum output was running 6.6 pct better than in December '53; (7) lumber production showed a 14.6 pct increase, paperboard output jumped 7.3 pct, and carloadings rose 2.2 pct.

And first reports in on January business show this trend is continuing. In the first 2 weeks of the year department store sales were up about 14.5 pct from January 1954; steel operations have advanced each week this year and last week hit a high of 88 pct. Reports from auto dealers continue to be optimistic.

INDUSTRIAL BRIEFS

Celebrating . . . Thompson Grinder Co., Springfield, Ohio, is celebrating a half century of business. William G. Baldenhofer is president and general manager of the company.

Becomes Division . . . W. J. Holliday & Co., Inc., recently acquired by Jones & Laughlin, is now known as W. J. Holliday & Co. Div. of J&L.

Mill Depot . . . A new mill depot has been opened by Wolverine Tube, Div. of Calumet & Hecla, Inc., in Minneapolis, to serve customers in this area.

Engineer of 1954 . . . Harry A. Kuljian, president of The Kuljian Corp. of Philadelphia was nominated by the "Engineers' Week Committee" of the Pennsylvania Society of Professional Engineers as the "Engineer of 1954."



X-RAY CHECK shows conveyor cables are still in good shape after seven years' service on Mesabi iron range. Eight million tons of ore have been hauled by this rubber conveyor belt, which runs up an incline 300 ft above the open pit. Use of X-ray permits on-the-job inspection of the steel cables inside the belt.

To Build . . . Dravo Corp.'s Contracting Div. was awarded the contract to build four huge piers for the new Mississippi River Bridge linking New Orleans and Algiers, La.

Company Formed . . . Delta Welder Corp., Detroit, is a newly formed corporation with Harry E. Day as its president. The company is qualified in the design, engineering, and building of completely automatic multiple-point welding machines.

Acquired . . . The Carborundum Co., Niagara Falls, has acquired the Curtis Machine Corp.

Appointed . . . Hartford Special Machinery Co., Hartford, has appointed representatives in the North Central area to handle its famous indexing device, The Hartford Special Super-Spacer.

New Plant . . . United Manufacturing Co. has moved production and administrative facilities from Bedford, Ohio, to a new plant at 3637 W. 56th St., Cleveland.

New Plant . . . Super Tool Co., Detroit, is opening a new plant at Elk Rapids, Mich.

New Quarters . . . Purchasing activities of Orinoco Mining Co., U. S. Steel Corp. subsidiary will be discontinued at 25 Broad St., New York, and transferred to 525 William Penn Place, Pittsburgh.

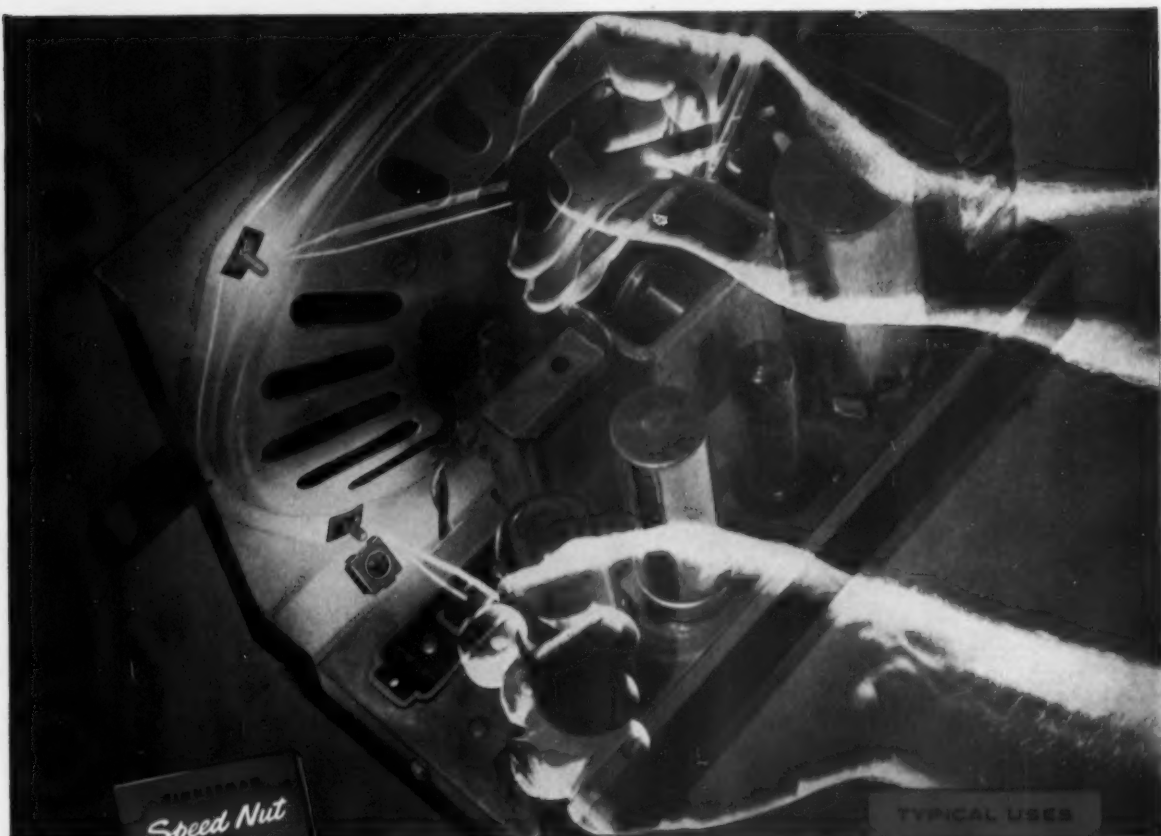
Going Up . . . Campbell Chain Co., York, Pa., is constructing a modern, one-story building in Portland, Ore., to expand its warehousing and distributing facilities in the Pacific Northwest.

Aluminum Production . . . Aluminum Assn. elected Everett G. Fahlman as its president. General feeling at the annual meeting recently was that 1954's record production would be exceeded this year. U. S. primary production in 1954 totaled 1,461,000 tons and net imports amounted to only 193,800 tons vs 337,600 tons in 1953.

They've Moved . . . Michigan Drill Head Co. has moved its Detroit general office and main plant to 11449 Timken Ave, Warren Township.

Employees Honored . . . National Cylinder Gas Co., Chicago, earlier this month honored 96 employees who have served the company for 25 or more years.

New Home . . . National Supply Co.'s Spang-Chalfant Div. has moved its New York City offices to 45 Rockefeller Plaza from 600 Fifth Ave.



How to Cut Costs 75%... with Tinnerman SPEED GRIPS®!



Assembly and material costs cut from 12 cents to less than 3 cents—a saving of 75% on just one fastening application! That's the Tinnerman SPEED NUT Savings Story for the Automatic Radio Manufacturing Company, Boston, on its CUSTOM-BUILT AUTO RADIO LINE.

SPEED GRIP Nut Retainers replaced hard-to-fabricate tapped holes and weld-type nuts as the mounting fasteners on each set. SPEED GRIPS are quickly and easily snapped into square punched holes. No special tools or skills needed! Flat Type SPEED NUTS also provide a vibration-proof attachment of speaker to baffle.

And here's a "temper-saver" for the man who installs the radio in his car. SPEED GRIPS have "mechanical hands" that hold the nut in bolt-receiving position for blind location attachments. What's more, they "float" to compensate for any misalignment in mounting holes.

There are more than 8,000 shapes and sizes of SPEED NUT brand fasteners to help you save assembly time, material costs and handling. Write today for your "SPEED NUT Savings Stories" booklet of typical Tinnerman savings to industry.

TINNERMAN PRODUCTS, INC. • BOX 6688, DEPT. 12, CLEVELAND 1, OHIO
Canada: Dominion Fasteners, Ltd., Hamilton, Ontario. Great Britain: Simmonds Aero-cessories, Ltd., Treforest, Wales. France: Aeroceusaires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). Germany: Hans Sickingher GmbH "MECANO", Lemgo-Lippe.

TINNERMAN

Speed Nuts®
FASTEST THING IN FASTENINGS®



SPEED GRIPS are applied by hand on this automobile floor pan.



Front seat grab handle of car is ready to receive bolts in final assembly.



SPEED GRIPS furnish a firm, sturdy attachment for television chassis mounting.



More than 8000 shapes and sizes



Test GM Cars With Ultra-Speed Camera

Called "time microscope" high speed photography studies suspension systems on proving ground . . . 15,000 frames-per-second show up design flaws in engine valve gear, diesel fuel injection—By R. D. Raddant.

♦ THEY call it the "time microscope" at the General Motors Proving Ground. That descriptive term means the use of high-speed photography to observe at visual speeds the fast operations of automobiles and their parts as well as the manufacturing operations that make them.

The high speed motion picture camera has become a valuable tool in solving problems and finding "bugs" in finished products or operations. It is even more important as an implement to prevent their occurring at consumer level.

About 100,000 ft of film are consumed in a year by the high speed photography section, an activity within the Experimental Engineering Dept. of the GM Proving

Ground. Richard O. Painter, assistant head of the department, supervises the operation.

Shoot Vehicles, Parts . . . About 20 pct of all film footage is aimed at moving vehicles and components such as suspension members. The remainder is used in studies of individual parts and their movements, machining and production, and special studies for divisions including such non - automotive ones as Delco Remy and Electro-Motive.

In fact, one of the big jobs in recent history involved the change from the 6- to 12-volt battery, particularly in the starter engagement for the ring gears. With the starter motor providing a higher impact,

it resulted in a different behavior of the mating gears. This problem was licked through the use of high-speed photography which showed clearly the gear behavior and led to corrective measures.

Study Body Vibration . . . Another important use of high-speed pictures is in the study of door locks and latches, their operation on slamming, and behavior on vibration and impact. The behavior of door seals and deck lids, studied under the "time microscope" led to prevention of paint chipping from faulty fits.

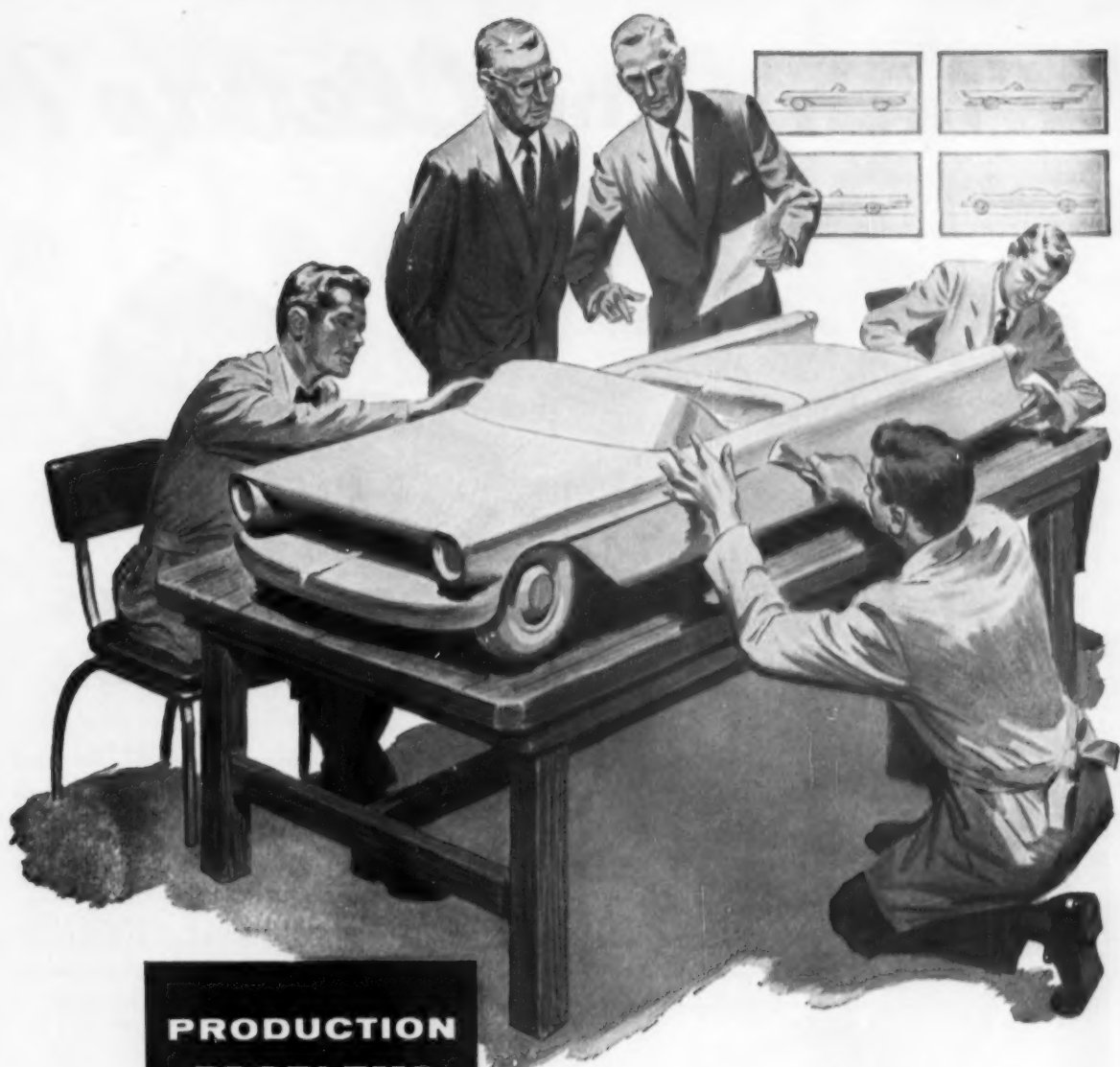
Roll over and body strength studies contribute to the safety of the automobile. Studies show the behavior of the car under specific crash conditions, deflections, and order in which weaknesses occur, or which parts crumple first.

A vital use of the fast camera is in valve motion study, a field of growing importance with the increase of compression ratios for today's auto engines. To make these studies, a vernier scale is mounted to the engine head and a sliding scale welded to the valve-spring retainer cap. Pictures at 15,000 frames per sec show to 0.001 in. of valve movement at 4600 rpm and make it easy to plot actual valve motion curves against the ideal valve-lift curve.

Reveal Valve Quirks . . . Original studies of one new high compression engine showed the valve opening overshot the theoretical curve, then bounced four times upon closing before settling down. These studies were of incalculable value in cam design, determination



"TIME MICROSCOPE" set up by GM shows high-speed camera focused on specially built rough road to study front wheel and suspension action.



PRODUCTION PROBLEM?

if you use flat-rolled steel
talk to a specialist

PROBLEM With present designs and manufacturing facilities, the auto industry needs wide coils of sheet steel with a minimum number of welds. These welds must be cut out before steel goes into the big presses—a costly, time-consuming process.

SOLUTION As a prime supplier to the automotive and other industries, Great Lakes Steel has developed facilities which now produce wide coils of steel in greater lengths . . . drastically reducing the number of expensive welds in each coil. Result: important fabrication savings for our customers.

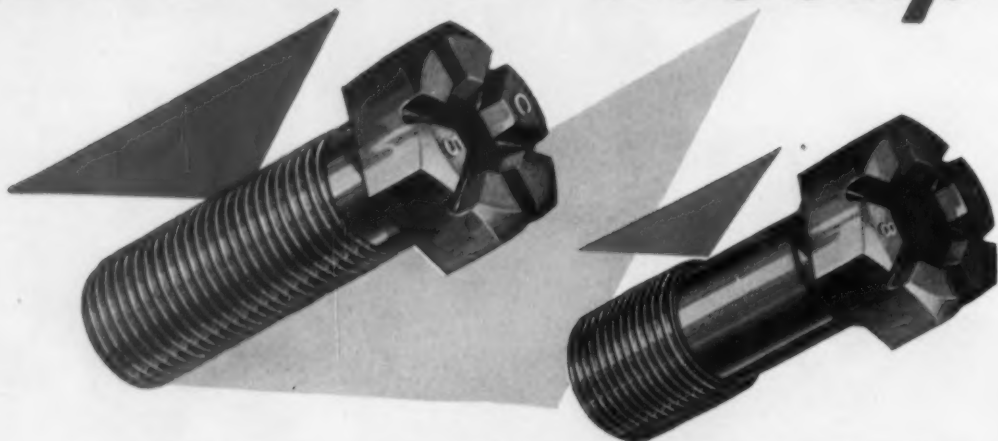
MORAL Whether you make autos, appliances, or farm machinery . . . if it's flat-rolled steel, you can't lose by talking to Great Lakes Steel—specialists in flat-rolled production and application for 25 years.

Great Lakes Steel
Detroit 29, Michigan

UNIT OF
NATIONAL STEEL CORPORATION

SALES OFFICES IN NEW YORK, CHICAGO, CLEVELAND, GRAND RAPIDS, LANSING, INDIANAPOLIS AND PHILADELPHIA

Which is the *CleCap*?



... both are — all types and sizes of the vibration-proof Place Bolt



Place Bolts are used in all types of automotive and farm equipment, for example—in fly wheels, main bearings, connecting rods and other high vibration points.

Be sure you don't overlook the definite advantages of this *one-piece self-locking* fastener where you have a vibration problem—the *tough strength* developed by cold-forging, and the *economy of assembly* (elimination of locking devices and no limit to the number of times the Place Bolt may be re-used). Saves weight, saves space, saves time.

Licensed under U. S. Patent No. 2543705, CLEVELAND has facilities for mass production of sizes ranging from $\frac{1}{4}$ " to $1\frac{1}{4}$ " diameter, standard or special shanks, in carbon (C-5) or alloy (C-8) steel.

Write for guide chart for calculating
wrench torques for "Place" type bolts.

The Cleveland Cap Screw Co.

2929 EAST 79TH STREET

VU lcan 3-3700

CLEVELAND 4, OHIO

TWX CV42

CLEVELAND *Top Quality* FASTENERS

Ferrous and Non-Ferrous: Bright, High Carbon and Alloy Steel
Heat Treated, Brass, Silicon Bronze, Stainless Steel

Hex Head Cap Screws— $\frac{1}{4}$ " to $2\frac{1}{2}$ " dia.

Socket Head Cap and Set Screws—Plain and Knurled: $\frac{1}{4}$ " to $1\frac{1}{2}$ " dia. Also Flat and Button Head Styles

Flat Head Cap Screws— $\frac{1}{4}$ " to $1\frac{1}{2}$ " dia.

Fillister Head— $\frac{1}{4}$ " to $1\frac{1}{4}$ " dia.

Set Screws—Square Head— $\frac{1}{4}$ " to $1\frac{1}{2}$ " dia.

Milled Studs— $\frac{1}{4}$ " to $1\frac{1}{4}$ " dia.

Place Bolts— $\frac{1}{4}$ " to $1\frac{1}{4}$ " dia.

Structural Bolts to ASTM Specification A325

Tractor Bolts

Special Hot and Cold Headed Parts

Facilities to make larger diameters than listed

Originators of the Kaufman **DOUBLE EXTRUSION** Process

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Feb. 12, 1955	174,495	15,830
Feb. 5, 1955	170,846	19,294
Feb. 13, 1954	117,796	23,774
Feb. 6, 1954	117,169	21,873

*Estimated. Source: Ward's Reports

of valve lifter materials, and other problems of valve motion leading to solution of the problems such as described here.

In the diesel engine divisions, high speed photography has been used with great success in studying fuel injection and in other items such as air scavenging, air cleaner studies and switch gears and relays.

GM Research Laboratories Div. uses high-speed photography for continuous studies of combustion chambers. The extent of this division's work in this field has resulted in installation of its own equipment and is not conducted by the Proving Ground facilities.

Analyze Production Machines

... Probably the biggest field for expansion of high-speed photography use is in connection with production machines and machining operations. This can take two directions: improving production ratio or improving quality by eliminating malfunctions that can not be seen by the naked eye.

GM's fast expanding Process Development Section is a growing client for the camera group and utilizes the "time microscope" extensively in developing and improving automatic operations. In fact, the growth of automation has opened up an entirely new field for the high-speed camera.

Sales Records Broken

Despite the record breaking auto output, sales to the customer are apparently keeping up pretty well with factory production, at least for this time of year.

This means that automakers are really sincere when they say they are not stockpiling cars against possible strikes in their own backyard or in the equally important steel industry.

The trade tabulator, Ward's Re-

ports, says that new car sales in January topped the 500,000 mark for the first time in history, hitting close to 515,000 units. This is 45 pct over the 355,000 cars retailed in January, 1954.

New car sales were about 80 pct of factory production less exports for the month, resulting in only about a 13 pct increase in dealer inventories during the month. As a result, dealer inventories are well below the usual figure for January.

Labor:

Studebaker-Packard Corp.-UAW reach new wage agreement.

Studebaker - Packard and the company's South Bend UAW local last week agreed to modifications of work standards in the labor contract, ending the threat of what could have been a disastrous strike at Studebaker Div.

The issue dated back to last summer when Studebaker workers took a voluntary wage cut and other contract changes in order to make the then independent automaker more competitive in labor costs.

AUTOMOTIVE NEWS

James Nance, president of the merged S-P Corp., had put through a tightening of Packard standards after he took over leadership of that company. The issue at South Bend was similar in nature.

The policy could hardly be called a "get tough" type of thing in that labor costs among the independents had been higher than in the Big Three and work standards generally lower. Hard-pressed smaller companies, on the short end of volume production, could hardly hope to survive unless labor costs are in line with the large competitors.

Mr. Nance earlier this month pointed out how Studebaker's labor costs were still injuring the company's competitive position. One of the most difficult problems in labor relations is regaining lost ground on one side or to yield hard won concessions on the other. It probably is a big credit to both sides that so much has been accomplished at South Bend without more serious troubles.

THE BULL OF THE WOODS

By J. R. Williams





There's an "invisible watchman" on every stand

WHEN you have *Texaco Regal Oil* in the circulating system, you have a never-failing "watchman" on every oil film bearing... constant assurance of dependable performance and low maintenance costs.

Texaco Regal Oil is heavy, turbine-grade oil especially made for this service. You'll like the way it resists oxidation, sludging and emulsification — its ability to separate quickly from water. You'll find it keeps bearings clean and lines clear for uninterrupted flow of protective lubricant.

In enclosed reduction gears, use *Texaco Meropa Lubricant* — noted for its high and constant "EP" properties. It resists oxidation, thickening and foaming, assures smoother operation, longer gear life.

Let a Texaco Lubrication Engineer help you get top performance from all your equipment and keep your maintenance costs at a minimum. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Regal Oils

(HEAVY CIRCULATING OILS)

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR, on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.



THIS WEEK
IN
WASHINGTON

Ike May Seek Price-Wage Controls

Ike soft-pedals "need" for controls . . . But reports continue on "desirability" of standbys . . . May ask legislation soon . . . ODM is readying blueprint for 90-day quick-freeze—By G. H. Baker.

◆ **POSSIBILITY** of federal controls over prices and wages grows stronger, despite the President's recent pooh-poohing of the proposal. He terms the need for controls as less than "vital." He says he believes Congress is perfectly capable of moving fast in time of emergency to enact such controls.

Despite President Eisenhower's soft-pedaling of the "need" for controls, reports continue to leak out of the White House about the "desirability" of asking Congress to grant control authority on a "stand-by" basis.

It is entirely possible that such request will be made of Congress within the next few weeks. The Eisenhower Administration has no intention of being caught with its political pants down. The Office of Defense Mobilization is preparing a "master plan" of controls that will permit the White House to lock in place all prices, wages, rents, and credit for 90 days. During this period, permanent controls would be readied for "long run" (probably for the duration) enforcement.

Signs Look Good . . . Firm indications of healthy, wholesome business for the next 12 to 18 months are cropping up anew in Washington. War or no war, a high level of the manufacturing industries and the distributing trades are indicated.

There's plenty of sound evidence to justify this promising outlook—not just the wishful thinking of politicians. Here are some of the definite prospects in sight for the months ahead, all indicating an optimistic picture:

- The government "take" from the individual income tax is expected to rise in fiscal '56 by a plump \$1.8 billion.

- Corporation profits are to climb, but tax collections will dip because of changes in the collection periods.

- Personal income will gain by about \$12 billion this year. This means individuals will earn a record-busting \$298,500,000,000 this year. Surveys show that they plan to spend most of it for consumer goods and services. New homes, new cars, better vacations are the goals. Less will go into savings this year.

- Incorporated firms are to show profits of \$38.5 billion (before taxes) this year. Last year, they earned only \$36 billion. (Biggest year ever was 1953, when corporations earned \$39.4 billion—which gives you an idea of the extent of this year's prosperity.)

- The Eisenhower Administration's business experts confidently expect a gain in the value of goods

and services produced of from 3 to 4 pct, bringing the total value of goods and services turned out this year to something over \$265 billion—which was the previous all-time high, set in 1953.

Fear Auto Strike . . . Congressmen from auto-producing districts see growing danger of an industry-wide strike by early summer. They report the United Auto Workers (CIO) attitude on the guaranteed annual wage has hardened to such extent that some UAW members believe the union has backed itself into a position where it may be impossible to bargain collectively. Gloomily, these congressmen confide that a strike may be inevitable.

Car and truck production is booming along at such a hefty rate that the union believes that this is a good time to ask for all it can get in the way of wages—and particularly for adoption of a guaranteed wage plan. Unit output of vehicles on some assembly lines is the highest of any week since 1951.

Ask Duty Suspension . . . A bill to suspend the tariffs on aluminum and aluminum alloys in order to promote imports from Europe is under consideration by the House Ways and Means Committee.

It would provide that primary and secondary aluminum in crude form, and bars, billets and blooms and alloys in crude forms, or bars, billets and blooms in which the aluminum exceeds the total of all other components could be imported duty free for 1 year.

It is sponsored by Reps. Daniel



"It's my understanding that he's the founder of the company."

Spectacular mobile ditching machine relies on MORSE power transmission products



The Earthripper is shown here after the machine has been lowered hydraulically from the truck body into ditching position.

The complete unit rests firmly on the truck body, allowing for easy transportation.

The amazing Earthripper—a one-man-operated machine which digs ditches from any angle, and at any angle up to 15° off vertical. The boom has a 90° arc, which allows the machine to dig vertically while on a slope. It permits a full-depth ditch while operating next to a curb or street.

Cutting clean and true, it virtually eliminates all hand digging. With the unusual teeth formation of the bucket line, it cuts through soil like a chain saw cuts through timber. It literally shaves off the sides of the wall, permitting easier cutting action in extremely hard formations.

The Earthripper uses only Morse

products for mechanical power transmission. Each machine relies on Morse Roller Chain in three sizes, 16 Roller Chain sprockets, a complete HY-VO Drive and a Torque Limiter.

Your product? Morse offers a complete line of power transmission equipment (see below), with a type and a size to fit almost every need. And Morse produces a line of precision products noted for long service life, trouble-free service, less maintenance downtime and low operating costs.

Why not write, today, for more information on how Morse can serve your product needs. Should you be in

need of engineering service to help solve some of your transmission problems, we'll see to it that you get skilled help which you can use.

Morse Chain Company
7601 Central Avenue
Detroit 10, Michigan



FOR 24 REASONS, MASTERS OF MECHANICAL POWER TRANSMISSION SINCE 1893

											
1 STANDARD ROLLER CHAINS	2 HIGH-ENDURANCE ROLLER CHAINS	3 SPRING-LOCK ROLLER CHAINS	4 ROLLER CHAIN SPROCKETS	5 TAPER LOCK SPROCKETS	6 DOUBLE-PITCH ROLLER CHAIN DRIVES	7 CABLE CHAINS	8 ATTACHMENT CHAINS	9 SILENT CHAINS	10 SILENT CHAIN SPROCKETS	11 HY-VO DRIVES	12 AUTOMOTIVE TIMING CHAIN DRIVES
											
13 FLEXIBLE ROLLER CHAIN COUPLINGS	14 FLEXIBLE SILENT CHAIN COUPLINGS	15 MORSEFLEX COUPLINGS	16 MORSEFLEX RADIAL COUPLINGS	17 MORSEFLEX & RADIAL DRIVESHAFTS	18 MARINE COUPLINGS	19 OVERRUNNING CLUTCHES	20 OVER-CENTER CLUTCHES	21 PULLMORE CLUTCHES	22 TORQUE LIMITERS	23 CENTRIFUGAL CLUTCHES	24 VARIABLE SPEED CONTROLS

A. Reed (R., N. Y.), Noah M. Mason (R., Ill.), and Ralph W. Gwinn (R., N. Y.).

Purpose of the measure is to encourage import of more aluminum from Europe and other areas. At present, almost all imported aluminum comes from Canada. The legislation is requested by several "smaller" aluminum users who believe they can get a price break by importing aluminum from other sources if the duty is removed.

Similar bills were introduced at the last Congress, but did not reach a vote.

Statutory duty on aluminum ingot is now 3¢ per lb, which was reduced under an international agreement negotiated through the General Agreement of Tariffs and Trade (GATT) to 1½¢.

Push Manganese Program

Domestic manganese purchase program would be extended for 5 years with procurement authorization increased several hundred pct under a bill now before the House.

Measure would extend the program through June 30, 1963, and increase from 18 million long tons to 105 million long tons the amount of ore to be purchased at the 5 depots. Two of these would be created by the bill.

Sponsor of the original bill is Rep. Wilbur D. Mills (D., Ark.). Two Virginia Democrats are sponsoring similar bills, Reps. Burr P. Harrison and Watkins M. Abbitt.

Push More Trade Fairs

Industry and business are invited to join with the government in participating in five additional International Trade Fairs, four in the fall of 1955 and a fifth early in 1956.

The government will participate in fairs in Turkey, Greece, Italy, Damascus and Egypt, in addition to 20 fairs already set, according to Roy F. Williams, Director of the Office of International Trade Fairs, Commerce Dept. Government officials are encouraging industry to exhibit at trade fairs as a means of making sales and also as an effective propaganda weapon.

Stockpile:

GSA issues progress report on some ores.

Deliveries of tungsten and columbium-tantalum under government buying programs instituted in 1951 and 1952 were nearly half complete, General Services Administration states.

The agency, aiming at a goal of 3 million short ton units (20 lb per unit), had accepted delivery of more than 1.4 million units as of Dec. 31. Deliveries are made at a number of milling points, principally in the West.

Give Other Details

Total quantity of columbium-tantalum ores and concentrates wanted by GSA is 15 million lb. Through 1954, deliveries of combined foreign-domestic materials amount to over 7.3 million lb.

Authorized for purchase are 37 million long ton units (22.4 lb each) of manganese, accepted at depots in Montana, New Mexico, and Arizona. Deliveries add up to slightly less than 12 million units.

Chrome ores and concentrates amounting to 200,000 long tons are intended for purchase by GSA. Deliveries total less than 80,000 tons.

Purchases of beryl total between 550 and 600 short tons, against a purchase authorization of 1500 tons.

WASHINGTON NEWS

May Snag Draft Bill

Draft law extension, approved on a 4-year basis by the House of Representatives, may be delayed in the Senate.

House action was brisk, but the Senate has indicated an unwillingness to follow suit until it has examined the probable effects of the proposed new military reserve program. This plan could influence considerably the availability of manpower for industrial work.

Need Faster Planes

Fighter planes capable of flying at three times the speed of sound are needed and should be built for the military forces, the chairman of the National Advisory Committee for Aeronautics maintains.

Also required by a modern air fleet, says Dr. Jerome C. Hunsaker, are atomic engines to propel bombers on nonstop, round-the-world flights at speeds of at least 700 mph.

Intensive efforts are being made to develop an aircraft engine operating on nuclear power, the veteran aeronautical scientist points out. He adds, however, that new weapons projects are being seriously delayed by a levelling-off of research spending.

Launch New Destroyer

All superstructure in the new Navy fleet-type destroyer, the *Forrest Sherman*, is made of aluminum to provide maximum stability and minimum weight.

This was revealed by the Navy on the eve of the recent launching of the new vessel at Bath, Me.

Structural members of the destroyer are of high-tensile steel to provide reserve strength in case of damage.

Engines are more powerful than those in earlier fleet-type destroyers. Gun batteries are of the latest types, capable of automatic action and high rates of fire. Anti-submarine armament includes torpedo tubes, depth charge projectors, and a depth charge rack.



"You ran an ad for a man willing to travel . . . Experience unnecessary."

ELMES Double-Action DRAWING & FORMING PRESS

"Custom Built" for deep drawing of large high-pressure gas containers

The press shown at right is a typical example of the work of Elmes engineers in designing hydraulic equipment to meet special requirements. This press is located in the plant of one of the nation's largest producers of high-pressure gas containers. A variety of container sizes, made of special high strength alloy steel, are drawn to exacting dimensional specifications. The press must maintain uniformly accurate concentric diameters and wall thickness in the part.

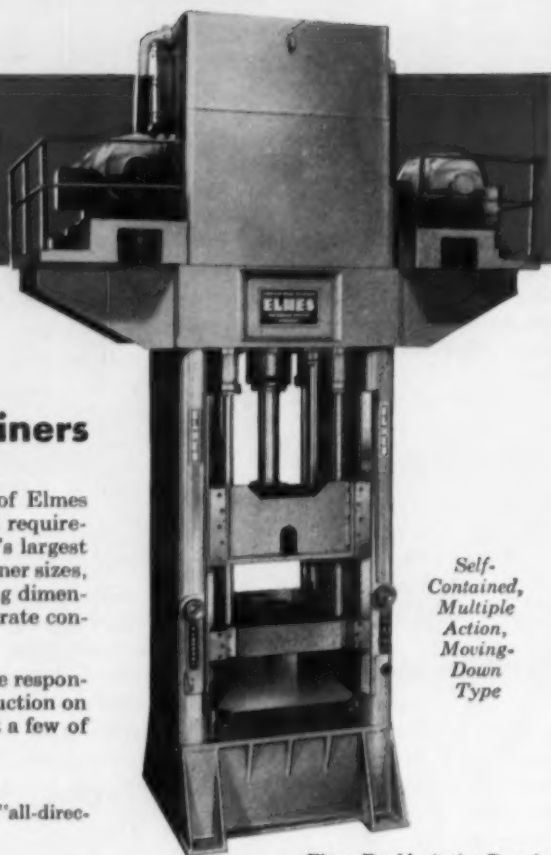
Many important Elmes construction and control features are responsible for maintaining the high quality and efficiency of production on this type of heavy-piece, deep-draw work. Following are just a few of these features:

- Ring key positioning, assuring constantly maintained "all-directional" alignment of press crown, bed, and housings.
- Extra-long guide ways for main and blankholder slide, counteracting all tendency of the slide to deflect during pressing operation.
- Provision for extra-fine gib adjustment and slide alignment obtained by use of non-metallic facing on the gibs and hand-scraped bearing surfaces.
- Press equipped with a separate pumping unit for powering the blankholder system. Assures maintenance of the blankholder pressure irrespective of main slide movement.
- Individual corner pressure adjustment provided for blankholder slide.

Elmes craftsmanship in press design and construction will assure you of press performance at its best. Recommendations and cost estimates will be promptly supplied, and entirely without obligation, of course. See your Elmes Distributor, or write to us direct.

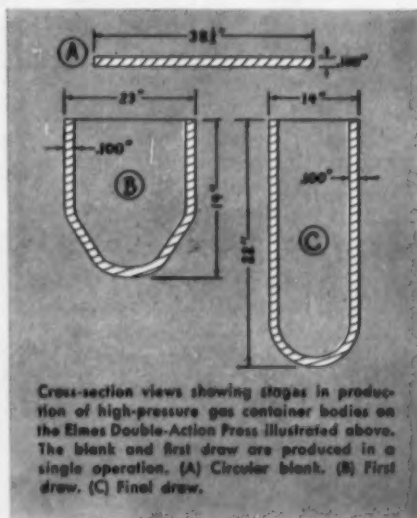
Standard or
Custom Built
Presses for

DRAWING AND FORMING
FORGING BENDING
STRAIGHTENING
TUBE REDUCING FORGING
COINING DIE SINKING ETC.



Self-
Contained,
Multiple
Action,
Moving-
Down
Type

Elmes Double-Action Drawing & Forming Press, equipped with die cushion. Main platen capacity 300 tons, blankholder capacity 100 tons. For single-action operations of main platen and blankholder, capacities are combined for a total of 400 tons.

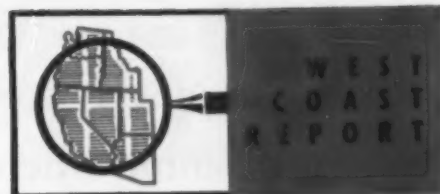


ELMES

AMERICAN STEEL FOUNDRIES • ELMES ENGINEERING DIVISION
1166 Tennessee Avenue ... Cincinnati 29, Ohio

HYDRAULIC PRESSES & EQUIPMENT

METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS



New Products Mushroom On Coast

Metalworking industry in the west has nurtured some unique, yet successful items . . . New special metal clip is carrier for beer cans . . . Show toilet-equipped hospital bed, portable X-ray—By R. R. Kay.

♦ **METALWORKING** men find the West a fertile field for sprouting the seeds of their imagination. Something of the pioneering spirit seems to make them less inhibited here than elsewhere in the U. S.

Manufacturers produce a constant crop of intriguing new ideas, new products, and new methods. And it's this kind of fresh thinking and let's-give-it-a-try attitude that gives western industry its vitality.

Carry Clipped Cans . . . Is the cardboard carrier, familiar to all supermarket buyers of canned beer and pop, on the way out? Special grip-the-lip steel clips to hold cans together may replace it. The clips couple cans in units of four, six, eight, or twelve.

The Los Angeles developer claims these advantages: steel clips are cheaper than paper carriers; conveyor lines are shorter by 30 ft; packaging speeds step up; shipping weight is cut; machinery for fastening the clips costs less than currently-used packaging equipment. Packaging machinery and conveyor equipment makers will watch this development.

It's claimed that this new western packaging approach has merchandising advantages, too: easier handling and stacking; improved display possibilities; increased tie-in sales by coupling commonly used canned items, such as fruits or vegetables.

Build Automatic Bed . . . A Compton, Calif., firm is producing a "nurse's dream" hospital bed. It's a 14-push-button affair, loaded with built-in plumbing. Chief fea-

ture is the push-button water closet which flushes into a sewer connection. Press a button, a two-foot square of the bed moves aside, and the complete toilet unit rises. Another button brings up a porcelain wash basin.

Button-pushing by the patient raises or lowers the bed, brings within reach an overhead trapeze bar to help him change position, starts and stops therapeutic oscillation.

The manufacturer happily sees hospital building costs lowered by reducing space allotted to bathrooms. And he predicts a less rugged life for nurses.

Portable Metal X-Ray . . . Metalworking plants may soon have atomic-powered, portable X-ray machines. A West Coast manufacturer will market, in about 30 days, a 20-lb unit containing its own power. It's safe to use, too, and requires no special precaution, the maker says.

The equipment is planned for use where conventional X-ray units are not feasible. It would make possible on-the-spot inspection of castings, welds, metal parts, and hard-to-get-to areas.

Important medical uses would be standby emergency equipment in hospitals, and field units for the scene of an accident, combat areas, and the home.

Uses Isotopes . . . The atomic X-ray unit uses radioactive isotopes of thulium 170 held in an aluminum capsule and lead shielded. Pictures are made by opening the lead shield enough to permit gamma ray exposure. The radioactive earth will give six to twelve months of service.

Eastern Firms Buy In . . . Eastern companies are looking for new riches in the industrial West. Big-name companies cross the Rockies almost every week to stake out new claims. . . Baldwin-Lima-Hamilton Corp., Philadelphia, bought Madsen Iron Works, Inc., Los Angeles-area manufacturer of heavy road-construction machinery. . . Elgin National Watch Co., Elgin, Ill., purchased American Microphone Co., Pasadena, Calif., maker of communications equipment.

Northrop Aircraft, Inc., and its subsidiary, Radioplane Company, Van Nuys, Calif., took over special, segregated facilities in the American Motors Corp. plant at El Segundo, Calif., for a top-priority pilotless aircraft project. . . Plomb Tool Co., Los Angeles hand-tool manufacturer, bought Industrial Tools Mfg. Corp. Plomb will use the facilities to make special tools.



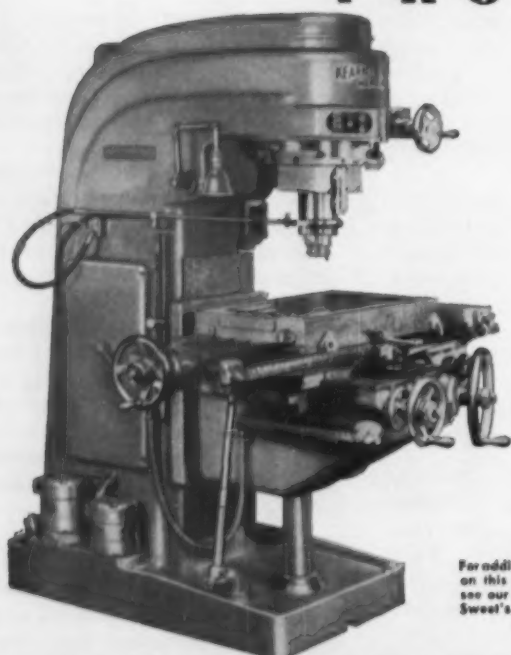
"For Pete's sake, Spike, stop making a pig of yourself!"

FOR RENT: one new machine. **COST:** only 44 cents per hour that's all you pay for this new Model 2D Rotary Head milling machine when put to work in your plant with...

Kearney & Trecker

TOOL-LEASE

PROGRAM



For additional data on this machine, see our catalog in Sweet's.

THIS new Model 2D Rotary Head milling machine costs you only 44 cents per hour... in operation in your plant. It's amazing. But under Kearney & Trecker's Tool-Lease Plan "A," one of three possible lease agreements, you make two semi-annual payments, totaling 25% of the machine's price during each of the first three years. And only 10% during each of the last four years.

What's more, you benefit from Model 2D's many time-saving operating features. The Rotary Head design assures greater accuracy and savings because you can do precision boring, drilling, slotting and milling of circular and angular cuts in both horizontal and vertical planes — without changing the setup.

Under Tool-Lease you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?



Shipbuilding, Ordnance and Miscellaneous Industry — Includes machines for shipbuilding; forgings; foundry machine shops; die casting; pipe fabrication; ordnance, including atomic energy, small arms, guns, gun carriages, ammo, fuses, explosives, fire-control instruments, tanks; steam engines, turbines and waterwheels. Of the total 27,216 machines, 12% are over 20 years old and over 48% are 10-20 years old!

Machines over 20 years old, which should definitely be replaced.

Machines 10-20 years old, which should probably be replaced.

Machines less than 10 years old.

5526 automatic and manufacturing type milling machines



7131 vertical milling machines



8722 knee type horizontal milling machines



3561 bed type milling machines



2276 horizontal and vertical precision boring machines



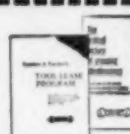
Figures adapted from 1953 American Machinist survey of Metalworking Industry.



KEARNEY & TRECKER CORP.

6784 W. National Ave., Milwaukee 14, Wis.

Please send me Bulletin TL-10A on Tool-Lease Program and booklet titled "Critical Picture of Creeping Obsolescence."



Name.....

Title.....

Company.....

Address.....

City..... Zone..... State.....



Builders Consider Overseas Plants

NMTBA head cites need for higher tariffs . . . U. S. designed tools built in overseas plants with low-pay labor could compete successfully with foreign products, sell for less back home—By E. J. Egan, Jr.

♦ AMERICAN machine tool builders don't mind setting up their own foreign plants or licensees if such moves will help them regain the amount of overseas business they used to enjoy. But they don't want to ship their foreign-built tools back to the U. S. to compete with native European builders for the American domestic market.

Any move to transfer American machine tool building overseas might be good business, but it diminishes our national defense potential. National Machine Tool Builders Assn. member firms want to keep plenty of machine tool capacity here at home. But they foresee a further drift to foreign subsidiary plants unless they can compete more favorably with European rivals here and abroad.

Want Realistic Trade . . . This reminder, and a plea for more realistic reciprocal trade agreements and tariff regulations, was recently delivered to the House Ways and Means Committee by M. A. Hollengreen, NMTBA president.

Occasion for the statement was one of a series of hearings the House Committee is conducting on U. S. trade and tariff policies. President Eisenhower is asking Congress to extend the Reciprocal Trade Agreements Act for three years. He is also requesting Congressional approval to cut "selected" tariffs by as much as 5 pct a year over that period.

Would Raise Tariffs . . . U. S. machine tool builders don't want to be included in any "selected"

group destined for a tariff slash. Instead they'd like to see the present 15 pct barrier against machine tool imports boosted considerably.

Mr. Hollengreen told the Committee that a number of American builders have already established plants abroad, and that others have licensed foreign firms to build their equipment. Prime reason is to buck stiff foreign tariffs, match low foreign labor rates and thus try to win back important overseas customers.

And then there is the other reason: matching European competitors at their own game of shipping low-cost equipment into the U. S. over the low 15 pct tariff hurdle.

Undercut Own Products . . . The NMTBA official mentioned recent studies that prove this entirely possible. He said an American builder can ship his foreign-built

machines to the U. S., pay the low tariff and still market them profitably at less than the break-even price of the exact American counterparts.

More than likely American builders would never shift their basic operations overseas on anything approaching a major scale. But there has been enough of a drift in this direction to be considered a trend by responsible industry executives.

Consider Overseas Plants . . . Mr. Hollengreen stated that still more U. S. firms, including the Landis Tool Co. which he heads, are considering taking such steps. He expressed the hope that Congress would seriously consider the unfortunate effect any such widespread movement would have on defense production capacity. "In an all-out war," he said, "it is most unlikely that this capacity or any other machine tool capacity on the continent of Europe would be available to strengthen our war industrial potential."

At still another recent Washington session, machine tool industry officials asked government authorities for a blanket initial draft deferment and top priority. Object is to prevent bottlenecks that delayed production in past emergencies.

Urge Pooled Orders . . . An industry representative at the same meeting also urged the Government to draft detailed plans for pool orders. Such orders in builders' hands would likewise save precious time in an emergency.



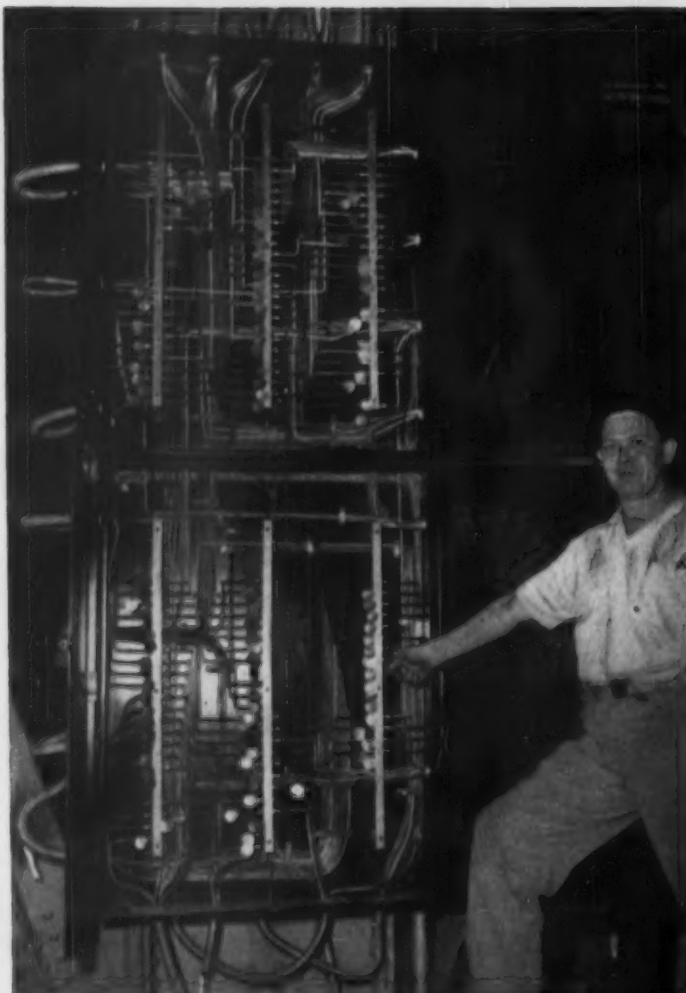
The New York Times

JOE E. EGAN

"Our accident rate is very low."

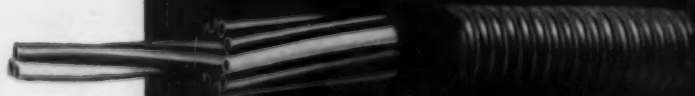
FOR INSTRUMENTATION AND CONTROL

Cabled Tube



Control Junction Box at Power Station of Long Island Lighting Company, showing use of Crescent Armored Multitube. Note that relatively sharp bends can be made without damage to the cabled copper tube.

Construction of Crescent Armored Multitube.



Some time ago Revere ran an advertisement featuring Crescent Armored Multitube for use in pneumatic and hydraulic instrumentation and control systems. The advertisement created so much interest that we thought you might like to see a photograph of an actual installation. The Control Board Junction Box shown here has 22 runs of Multitube coming into this box comprising 224 Revere Copper Tubes of 1/4" O.D. The picture was taken in the Glenwood Landing, N.Y. Power Station of the Long Island Lighting Company. The tubes go to instruments that report information on temperature, main and reheat steam pressure, boiler feed and condensate pump pressure, fuel oil and gas pressure, liquid levels, tide level and for the control of fuel feed, draft dampers, boiler drum water level and various control valves.

This is a relatively new use for Revere Copper Tube, but it is an important one in these days when new ways are being found to obtain process information more quickly and accurately, or to achieve automatic control. Crescent Armored Multitube is made by Crescent Insulated Wire & Cable Co., Inc., Trenton 5, N.J., in lengths up to 1,000 feet. It consists of a group of long tubes twisted together in cable form, protected by a flexible interlocked galvanized steel armor, or by plastic, or both. As many as 19 tubes, 1/4" O.D., can be cabled, with one tube in each layer color-coded. Larger tubes can also be cabled, including 5/16", 3/8" and 1/2". This construction affords protection during shipment, installation and use, and speeds up installation greatly. For further information, write Crescent, and for tube in copper and aluminum, see the nearest Revere Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.



The Iron Age

SALUTES

Alton F. Davis His interest in the development of men and techniques over a 30-year period has given the welding industry a big forward push and earned him the friendship of hundreds in all fields.

A Red agitator trying to picture the American industrialist as hard and narrow wouldn't get far with the hundreds who have been helped by Alton F. Davis, vice-president and secretary of The Lincoln Electric Co., Cleveland.

Mr. Davis is a leading industrialist. His 30-year record of achievement in the welding field recently earned him the Samuel Wylie Miller Medal, top honor of the American Welding Society. But what makes it pleasant to talk about him is the spirit of warm fellowship that has marked his successes.

In the welding field he has encouraged and assisted young men in technical research. In other areas he has been a leading force in youth activities, hospital programs and educational movements. A friendly guy who collects stamps and reads mystery stories, his real specialty is helping people.

Born in Diamond, O., Alton Frank Davis attended schools in Alliance, O., spent 2 years at Mount Union College and completed his studies

in 1914 at Ohio State. He holds the degree of Mechanical Engineer in Electrical Engineering from that University.

Going from college to Lincoln Electric, Mr. Davis has been a vice-president of that company since 1925 and secretary since 1938. He was named secretary of the James F. Lincoln Welding Foundation at its formation in 1936.

Welders all over the world know Mr. Davis through the "Stabilizer," a magazine he has been publishing for 26 years. Ohio State students know him as founder of the A. F. Davis Welding Library, most extensive of its kind in the world.

Mr. Davis is president of the Ohio State Alumni Association and co-chairman of the Independent Colleges Assn. in Ohio. He is board president of the Euclid-Glenville Hospital and on the executive board committee of the Cleveland Hospital Assn. He is a director of the American Welding Society, belongs to numerous other professional and civic societies.

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and

get this **BIG BONUS** ➔



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INCORPORATED

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- Flame enrichment • Desiliconizing
- Decarburizing • Hot top heating

An Air Products Multiple Generator Lease Installation will enable you to:

- Save many thousands of dollars every year on existing oxygen requirements
- Improve technology thru experiments with surplus oxygen

Here's how it works. You cut costs of meeting basic oxygen requirements because you "make your own" . . . eliminate transportation and handling costs. You produce *practical experimental oxygen* because your installation affords a substantial amount of *surplus capacity*.

This allows you to produce extra oxygen at such a low cost it makes feasible promising experiments you may have considered too expensive.

Practical experimental oxygen is just one of the many "extras" you get when you cut costs with an *Air Products Multiple Generator Installation*. Equipment can be adapted to also produce by-product nitrogen and argon at high purities . . . if you need them now or ever want them. Let us show you the possibilities for your company!

Air Products, Incorporated
Dept. 1, Box 538, Allentown, Pa.

Low Cost Oxygen . . . Nitrogen . . . Argon

Send us your monthly consumption for the last twelve months.
We will submit actual figures showing the savings you can make.

The Iron Age INTRODUCES

Gordon C. Huth, elected vice-president, industrial relations, **U. S. Steel Corp.**, New York.

E. E. Anderson, appointed vice-president, **Metal & Thermit Corp.**, New York.

Joseph W. Kennedy, Jr., named vice-president in charge of Ohio Seamless Tube plant, Shelby, Ohio, **Copperweld Steel Co.**

J. D. Allen, Jr., elected vice-president and general manager, **The Hamilton Steel Co.**, Cleveland; **N. E. Willkomm**, promoted to general sales manager.

William H. Graves, elected vice-president and director of engineering, **Studebaker - Packard Corp.**; and **Herbert L. Misch** becomes chief engineer, Packard division.

John F. Myers, elected a vice-president, **Westinghouse Electric Corp.**; and **George W. Jernstedt**, appointed director of a new manufacturing laboratory.

Robert L. Cashen, appointed vice-president and Eastern district manager, **The H. K. Ferguson Co.**, Cleveland.

George M. Reaves, elected a vice-president of the **Turner Construction Co.**, New York.

R. F. Bradshaw, becomes financial vice-president and secretary, **Dodge Steel Co.**, Tacony, Phila.; **A. S. Breithaupt**, elected vice-president, sales; and **M. D. Leopold**, becomes treasurer. **N. G. Kriebel**, named assistant treasurer.

Edward L. O'Neill, elected vice-president and general sales manager, **Emerson Electric Mfg. Co.**, St. Louis.

Theodore J. Zeller, elected vice-president in charge of operations, **Mack Trucks, Inc.**, New York.

Nelson M. McGuire, appointed assistant to the vice-president for sales, **The American Manganese Steel Div.**, **American Brake Shoe Co.**, New York.

F. R. Dickenson, appointed a director of **Hagan Corp.**, Pittsburgh, and its subsidiaries.

Harvey B. Greene, appointed a director, **National Automotive Fibres, Inc.**

Neil S. McCarthy, elected to board of directors, **Servomechanisms, Inc.**, Garden City, N. Y.

John E. Timberlake, elected a member of the board of directors, **Jones & Laughlin Steel Corp.**, succeeding **Adam J. Hazlett** who has retired. Mr. Hazlett will continue as consultant to the president.

PERSONNEL



CHARLES LEE HOMER, appointed president, **Stran-Steel Div.**, **Great Lakes Steel Corp.**



PAUL H. STARTZMAN, elected president, **Oliver Iron and Steel Corp.**, Pittsburgh.



MORRIS F. KETAY, elected president of **Ketay Instrument Corp.**



E. W. HARWELL, appointed president, **Nottingham Steel Co.**, Cleveland.

Kermit T. Kuck, elected a director, **Monarch Machine Tool Co.**, Sidney, O.

Harold R. Foss, appointed director, Manufacturing Engineering Office, **Ford Motor Co.**, Dearborn.

Russell J. Geltman, appointed chief engineer, **Link-Belt Co.**, San Francisco plant.

Max E. Chandler, elected controller and treasurer, **Beaver Pipe Tools, Inc.**, Warren, Ohio.

Clayton L. Davis, appointed technical service director, **Universal Atlas Cement Co.**, New York. He succeeds the late Earl R. Bryant.

Clifford J. Lewis, appointed sales engineer, **National Gypsum Co.**, Buffalo, N. Y.

Robert F. Renkin, appointed research and development engineer, **Sharon Steel Corp.**; and **George D. Myers**, superintendent, Hot Strip Finishing Div., promoted to superintendent of coating.

Folke Gustafson, appointed factory service engineer, **Whitney Chain Co.**; and **Robert W. Grady**, becomes national factory field representative.

William F. Fetzer, named general sales manager, **Phillips Corp.**, Carnegie, Pa.

James A. Wilson, appointed plant manager, **Kaiser Aluminum & Chemical Corp.**, Baton Rouge, La.; and **Ray Woodman**, becomes manager, Raw Materials Div.

Niels C. Beck, promoted to assistant manager of program development, **Armour Research Foundation** of Illinois Institute of Technology, Chicago.



DR. JAMES T. EATON, elected vice-president-production, **E. F. Houghton & Co.**, Phila.



BERT L. SNELL, appointed vice-president, **Luria Construction Corp.**



JOHN W. LINDSEY, appointed director of purchases, **Jones & Laughlin Steel Corp.**



RICHARD A. BIGGS, appointed manager, Product Development, Stainless Div., **Crucible Steel Co. of America**, Pittsburgh.

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Investigate the important production, maintenance and tax savings of **SIMMONS ENGINEERED REBUILDING** for your: Lathes, Planers, Surface Grinders, Cylindrical Grinders, Vertical Millers, Openside Planers, Automatics, Vertical Boring Mills, Turret Lathes and Radial Drills.

A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. **Simmons Machine Tool Corporation**, 1721 North Broadway, Albany 1, N. Y.



*Write for Simmons Way...
case histories of rebuilding jobs.*

SIMMONS GIVES MACHINE TOOLS A NEW LEASE ON LIFE

Unconditional guarantee...our standard since 1910



WEAN

ENGINEERING

Company, Inc.
WARREN, OHIO



ACCURACY ★ HIGH PRODUCTION ★ ECONOMICAL OPERATION

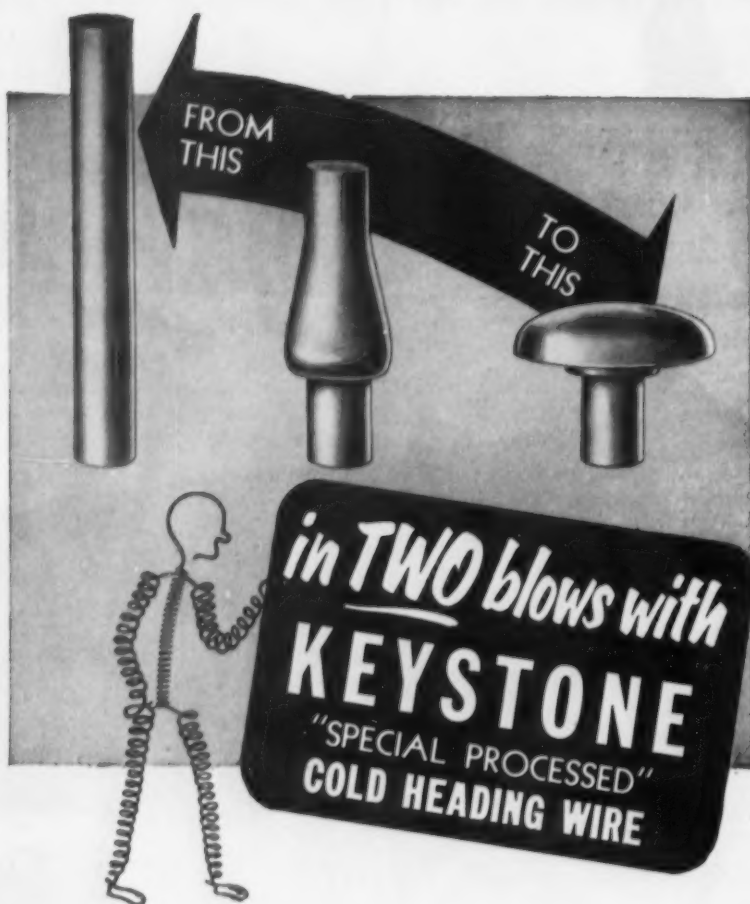
Faster, more economical production with closer control of product quality — that's the thinking that goes into every Wean engineered sheet, tin or strip mill line.

Leading steel mill officials the world over have learned they can depend on Wean engineers to design and produce equipment unmatched in accuracy, high production and economical operation.

If you're planning production improvements to combat high labor costs, increase your margin of profit or improve the quality of your product, make sure you check first with a Wean engineer.

S

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT



Forming the above Special Pan Head Bolt in two blows presented a difficult cold heading problem that was solved by the use of Keystone "Special Processed" Cold Heading Wire.

The superior grain flow characteristics of "Special Processed" Wire provided the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the two blow process. The head was formed without buckling, distortion or cracking—longer die life, increased production, and a higher quality finished product resulted.

Carefully selected ingredients—our own exclusive drawing and heat treating process—rigid quality controls and inspections—give this wire unsurpassed performance on any unusually difficult cold heading job. Your inquiry is welcomed.



PERSONNEL

A. E. Reinhard, appointed general superintendent, Portsmouth Div., Detroit Steel Corp.

Theodore Barney, becomes assistant superintendent of the Coke plant at the Campbell Works, The Youngstown Sheet & Tube Co.

Lowell H. Miller, appointed as an industrial sales representative, Nubian Industrial Div., The Glidden Co., Cleveland.

Robert O. Frick, appointed advertising manager, of Philadelphia Gear Works.

Philip H. Rollings, appointed division purchasing agent, Blaw-Knox Equip. Div., Blaw-Knox Co., Pittsburgh.

OBITUARIES

Sam Stern, 55, founder and president, Action Diamond Tool Co. of Chicago. He was one of the originators of the diamond impregnated wheel for the grinding of carbide.

A. R. Pollard, 68, president, The Pollard Brothers Mfg. Co., Chicago, recently.

John J. Cadot, 65, executive vice-president, Hardinge Co., Inc., York, Pa. after undergoing an operation recently.

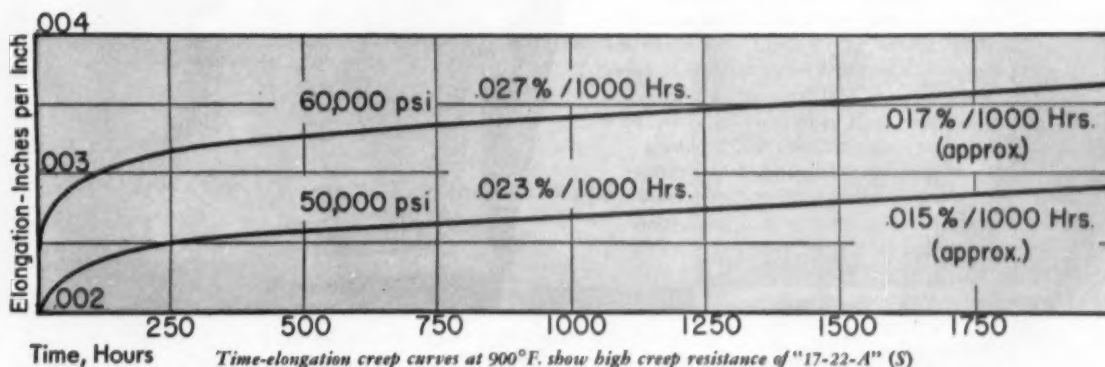
Samuel F. Walton, 66, vice-president and technical director, The Exolon Co., Tonawanda, N. Y.

Mark Jacobson, 61, Detroit industrialist, partner in the Mark & Harry Jacobson firm, recently in Miami Beach.

W. L. Rowlands, 49, manager, Washington, D. C. office Continental Can Co. suddenly after a heart attack.

SAVE ALLOYS, GET HIGH ALLOY PERFORMANCE IN GAS TURBINES WITH "17-22-A"® (S) STEEL

Contains less than 3% alloy
Gives maximum creep resistance to 1000°F.



If your gas turbine parts operate at temperatures not exceeding 1000°F., you can save critical alloys, yet get high alloy performance by using "17-22-A" (S) steel produced by the Timken Company.

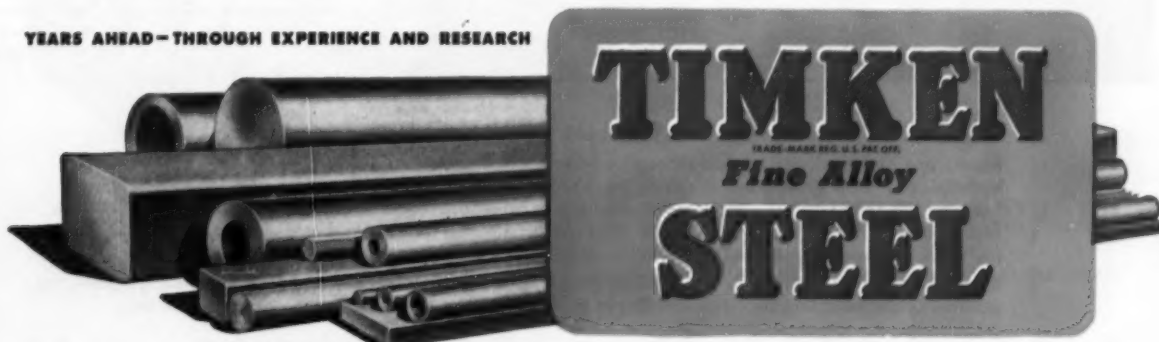
"17-22-A" (S) steel contains less than 3% alloy. It permits you to cut costs. Developed by metallurgists of the Timken Company, "17-22-A" (S) has been used successfully for 10 years in refinery and steam power applications. The graph above shows its creep resistance at 900°F.

"17-22-A" (S) also resists heat checking and thermal

cracking. It is readily workable up to 2300°F. It's easy to machine and weld. Maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

For complete information on "17-22-A" (S), and its companion analysis, "17-22-A" (V)—used at temperatures up to 1100°F.—write for Technical Bulletin Number 36A. And for help with your high temperature problem, call upon our Technical Staff. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

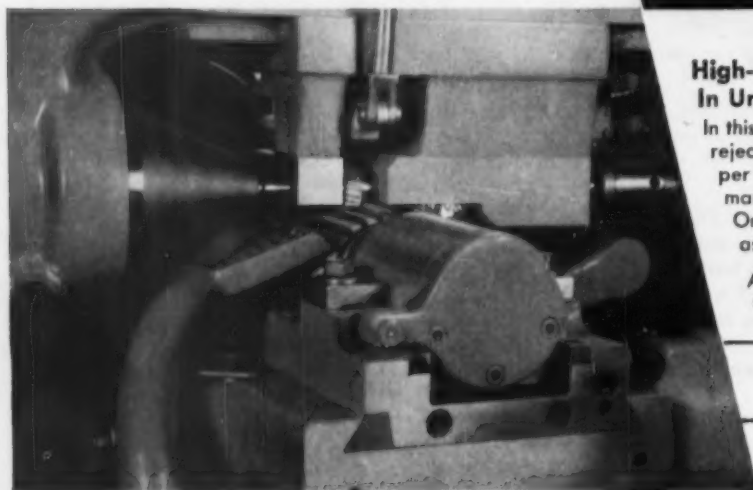
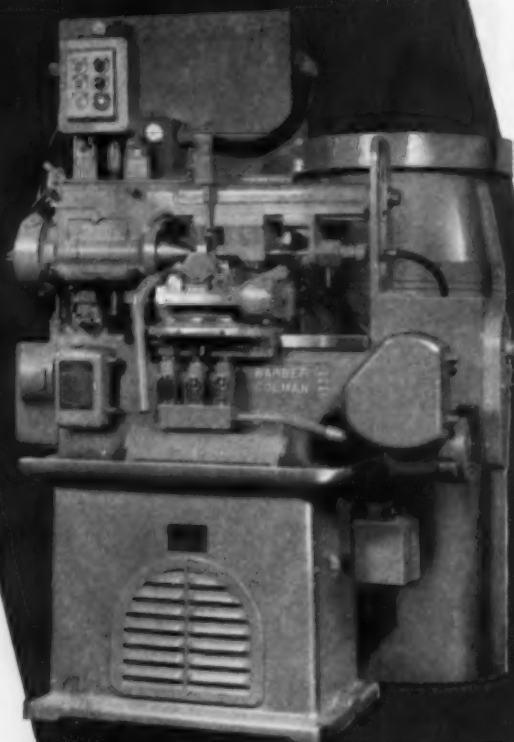
February 17, 1955

87

Fully Automatic GEAR HOBGING

**offers
new low costs
on gears
16 pitch or finer**

As more and more gear operations are modernized to place them on a competitive basis, automatic gear hobbing equipment becomes an essential approach in reducing gear costs. Since 1937 Barber-Colman engineers have been working closely with major gear producers in the application of automatic gear hobbing. At first, automatic hobbing applications were made in the watch gear and instrument fields. Later, machines were built for medium pitches in other fields, such as fishing reel gears. Now this latest Automatic No. 6-10 Hobbing Machine is designed specially for cutting automatic transmission and speedometer gears to meet the required rate of production on an automatic production line.



High-Production Plant Reports Savings In Unit-Costs with Fewer Gear Rejects

In this particular production plant, fewer gear rejects are occurring. An overall reduction in cost per gear has been effected through reduced man-hours and continuous high-speed output. One of a battery of machines performs as follows:

Automatic Cycle —	356 Hob RPM, 175 Hob SFM. .050" feed per rev., 60-second complete cycle time.
Transmission Gear —	16 teeth, 18° 30' helix angle 18 DP., SAE 1330, .937" OD. x 3/8".
Class C Accurate Unground Hob	1 7/8" dia. x 3" face x 3/4" bore, 1 thread, unground pre-shave.

Completely Automatic Cycle Provides Continuous High-Speed Gear Cutting

Blanks are automatically loaded through a hopper-feed system and positively located and clamped hydraulically on a solid arbor in cutting position. The cycle sequence includes rapid traverse to the hobbing position, lowering of the work slide to cutting depth, hobbing the blank, raising the work slide, rapid traverse to the right, and unload. A new blank then is automatically presented for hobbing and the cycle repeated continuously until the machine is shut off.

Machine features include automatic hob shifting for greater tool life and metered hydraulic pressure for positive arbor mounting and ejection. Rapid traverse is actuated electrically, and the work slide is hydraulically actuated.

BUILDERS OF PRECISION GEAR

Adaptable to Wide Range of Long-Run, High Speed Gear Production.

This type of cycle arrangement is adaptable to many similar long-run gear cutting operations within the general range of 16 pitch and finer, depending upon the particular gear specifications. The cycle is arranged to suit the requirements of the job, and tooling, feed, speed and cycle-timing will depend upon the required production and gear specifications.

Positive Control Over Gear Accuracy Through Automatic Arbor Loading.

Barber-Colman automatic hobbing supplies positive gear accuracy control through specially developed tooling which mechanically mounts blanks solidly upon the work arbor prior to cutting. This arrangement eliminates chances for looseness, runout or vibration likely to occur in other types of mounting. Work arbors are designed for positive pick-up and location of the blank.

Cycle Fully Protected by Automatic Stop

A combination of electric limit switches, program motor and mechanical movements governs the cycle. Faulty blanks are automatically rejected if presented for hobbing, and the machine is under complete control at all times.



Rear View Showing Automatic Loader and Electrical Panel

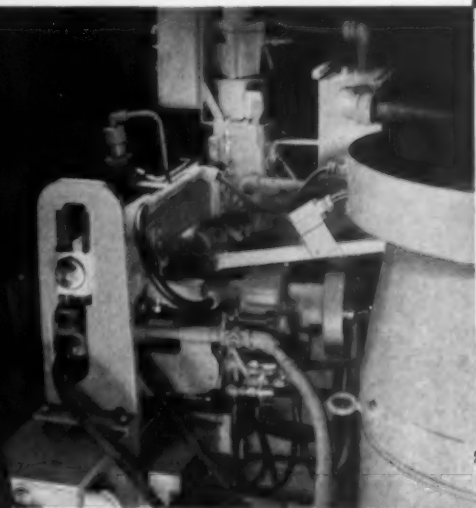
Engineering Service Available Without Obligation

Check your high production gear operations to determine whether you are maintaining a competitive cost basis. Barber-Colman engineers will gladly consult with your gear production people to demonstrate the cost-saving benefits of automatic hobbing. Ask your Barber-Colman representative to arrange an appointment for you, or write directly to Automatic Hobbing Engineering. No obligation!

1936

1937

1944



Close-up of Automatic Loading

HOBBS • CUTTERS • REAMERS
HOBGING MACHINES
HOB SHARPENING MACHINES



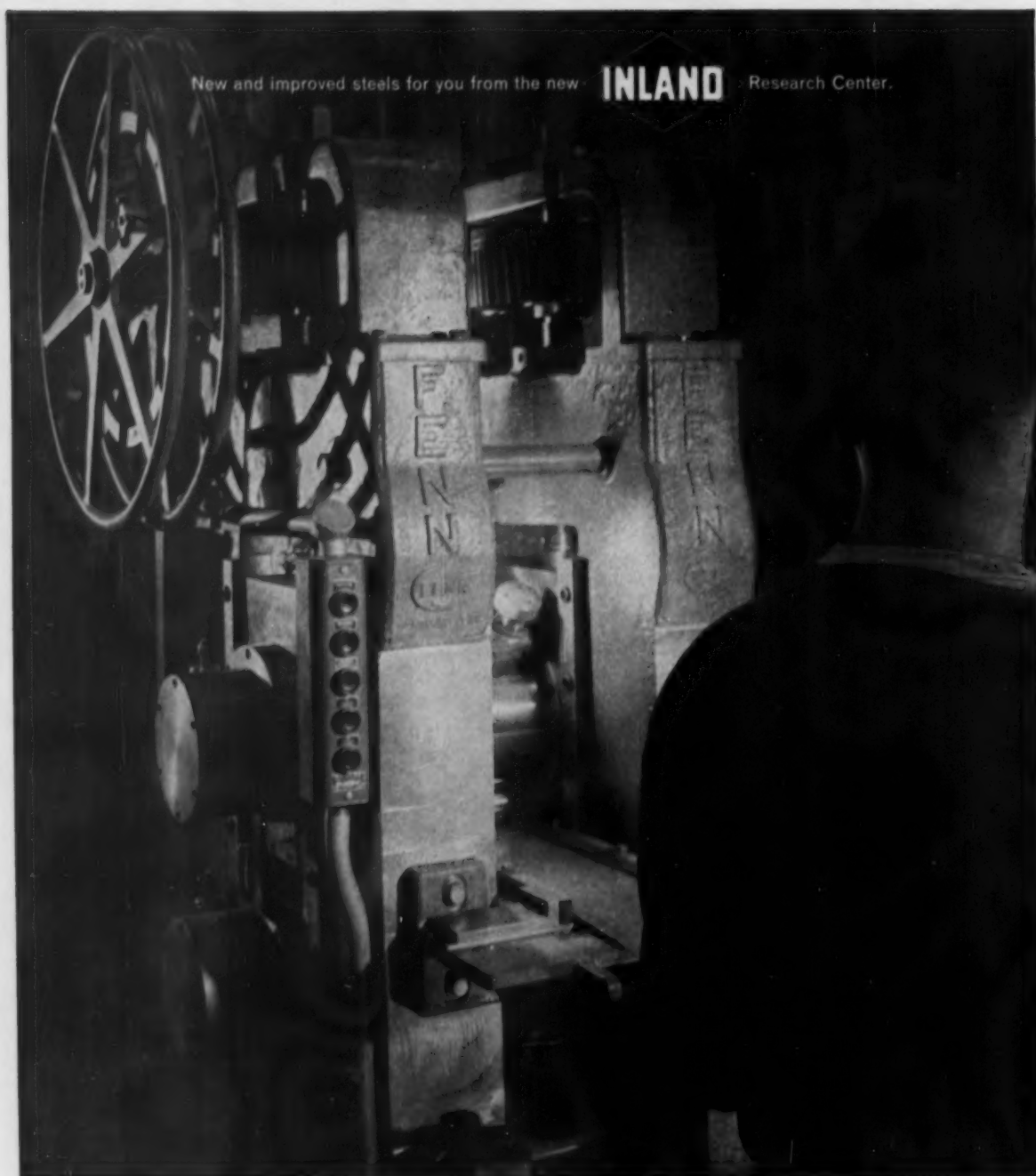
Barber-Colman Company

GENERAL OFFICES AND PLANT,

662 BEEK STREET, ROCKFORD, ILLINOIS

H O B S A N D M A C H I N E S S I N C E 1 9 1 1

February 17, 1955



New and improved steels for you from the new **INLAND** Research Center.

**THIS PINT-SIZE ROLLING MILL MAY SAVE YOU
KING-SIZE HEADACHES (AND MONEY TOO!)**

At Inland, "new ideas" are considered as vital a raw material in steel-making as top grade iron ore and coal. Establishing reserves of this basic ingredient is a continuing job for Inland's research and development people. The new Inland Research Center in Hammond, Indiana, where Inland researchers look for better steels and more efficient ways to make them, is the most recent addition to Inland's "new idea" resources.

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul
Davenport • St. Louis • Kansas City • Indianapolis
Detroit • New York

Principal Products: Sheets • Strip • Structural
Shapes • Plates • Bars • Tin Mill Products • Rails
and Track Accessories • Coal Chemicals



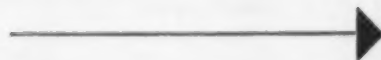
FORGING INGOTS weighing to 150 tons are cast in large tank, 9m high and 4.5m in diam.



TECHNICAL
ARTICLES

Low pressure degassing—

Vacuum Cast 150 Ton Forging Ingots In German Plant



♦ Forging ingots weighing up to 150 tons and essentially hydrogen free are being vacuum cast commercially in Germany . . . Substantial improvements in metallurgical quality and a sharp reduction in manufacturing costs have resulted . . . Extensive slow cooling periods and lengthy heat treatments normally required in making forging ingots for power plant generating equipment have been largely eliminated . . . The techniques have been applied successfully in the production of high alloy cast steels.



IN VACUUM casting large ingot, steel is first poured into intermediate ladle, then into a mold placed in vacuum tank. Engineers, lower left, follow casting through quartz windows.



LADLE of degassed steel as it is lifted out of the vacuum tank prior to a pouring operation.

♦ VACUUM CAST forging ingots, free of hydrogen and weighing to 150 tons, are being produced commercially at the plants of Bochumer Verein AG, Germany. During the past two years more than 10,000 tons of high grade alloy steel have been vacuum cast for applications such as inductor shafts and turbine rotors for power plants.

The method, which reduces hydrogen and other gases in cast alloy steel by degassing to negligible quantities, considerably shortens the working cycle and cuts production costs. Heretofore hydrogen has been eliminated by very slow cooling of the steel ingots. In some cases the cooling period covered several months. The vacuum casting techniques developed at Bochumer Verein, by eliminating the long cooling periods and extensive heat treating cycles, offer important economic advantages.

The vacuum casting method is especially useful in casting high alloy steels. These include the heat resisting grades and steels with alloying elements such as vanadium, titanium, niobium and aluminum which oxidize easily on exposure to air.

Recent technical developments in the building of steam turbines have exploited the advantages of higher steam temperatures, up to and above 600°C. As a result, the metallurgical and engineering specifications for basic components have become more and more difficult to meet. The closer control of metallurgy possible with the vacuum casting method has simplified the problems of obtaining desired physical

Analysis of Gases from 100 Ton Ingot

Minutes after starting degassing:	Barometric Pressure, Torr	Gases, Volume, Pct			
		CO ₂	CO	H ₂	Balance:
10	2	1.0	0.6	1.2	97.0
25	1	4.6	3.0	6.6	83.6
60	0.5	5.0	4.4	9.0	81.6
240	0.4	1.6	2.2	4.4	91.8

properties in metals which must operate in these high temperatures.

The most carefully prepared steel will always contain some gases. These, mainly hydrogen, but also including oxygen and nitrogen, will have a rather damaging effect.

There are a number of ways by which hydrogen may enter steel. Most ores, ferroalloys, and lime used in smelting and refining steel, as well as the air and water in the air, contain hydrogen. Dirty and oily coatings on scrap irons are another source of hydrogen. In casting, hydrogen may be picked up in the pouring spout and ladle.

Liquid iron can release and absorb considerable hydrogen. In theory, up to 30 cu cm of hydrogen can be held in 100 g of liquid iron at about 1600°C. In cooling, especially at the moment of congealing, the releasing capacity for hydrogen is greatly diminished. At 1200°C,

100 g of solid iron can contain not more than 8 to 9 cu cm of hydrogen. At room temperature, the releasing capacity is even more reduced. Unfortunately, the full quantity of hydrogen does not escape from the steel.

Some hydrogen diffuses to preferred places in the interior of the ingot. There, two hydrogen atoms unite to form H_2 molecules. More and more atoms find their way to these places. Under certain conditions, these accumulated gases, under high pressure, effect an inner rupture of the steel particles and weaken the material.

Research program started

The shadow lines appearing in standard castings are the paths of gas bubbles in certain parts of the ingot, which were crossed just before or during the congealing. It appears that the technological values obtained in making tensile and notched-bar impact tests, transversely to these segregations, are often unsatisfactory and, in these zones, a flocculation is often found. These faults are avoided to a large extent in vacuum casting. Toughness values are much better and the tendency of embrittlement (weld decay) is diminished.

In an effort to solve both the engineering and production problems arising from hydrogen in cast steel, a research program was started several years ago.

Since it is impossible to put complete Siemens-Martin or electric furnaces under a vacuum a method of degassing the already smelted steel was developed. First work was done in laboratories with small vacuum smelting equipment. At first it was not known how much gas the steel would yield and how large the vacuum pumps had to be. No water jet systems or other pumps were available with the necessary ca-

capacity. These requirements were met first by combining available pumping systems to a larger aggregate and later by developing pumps for the job.

Preliminary tests with ingots weighing up to 10 kilos were made in 1950. This small vacuum plant contained the most important elements of the later larger plants. Later, an evacuation installation was built for casting larger ingots. At first, water-jet pumps were used to obtain a sufficient vacuum. Results were not satisfactory as, due to a rediffusion of water vapor in the steel, it was more difficult to determine the hydrogen contents. In 1952, at the time a 40 ton electric furnace was placed into operation the first equipment was installed provided with 3 Leybold Pumps with a capacity of 600 cu. m, each. Today two vacuum tanks are available. In one, with 2.4 meters inside diameter and 4.2 meters inside height, ingots weighing to 35 tons can be cast daily.

In a second, larger tank, having an inside diameter of 4.5 meters and a height of about 9 meters, forging ingots weighing to 150 tons may be cast. All three tanks are served by a central pumping station consisting of eight high vacuum pumps and one backing pump with a capacity of approximately 5000 cu. m per hour.

Tight closure attained

These tanks, which can be hermetically sealed for high vacuum right from the beginning, may be operated together or separately. Operating normally, a vacuum of up to 0.2 Torr may be reached at the beginning of the cast.

In placing the cover on the tank some difficulty was experienced in obtaining a perfectly tight closure. This problem was solved through



FOR CLOSE hydrogen analysis a sample of liquid steel is first spooned from the furnace. From this a smaller sample is sucked up in a pipette and placed in mercury to avoid hydrogen loss.

a closure of special design. Special care had to be taken to insure that the packing protected the high vacuum absolutely. (1 Torr = 1 mm barometric pressure. Normal air pressure is 760 mm barometric pressure.) The cover must withstand high pressures without being crushed. Besides holding tight, it must remain undamaged under heating of short and long duration. It must permit quick placing and removal. It cannot be sensitive to rough handling. Specially placed quartz glass windows in the cover permit a good view of the casting process.

Three methods of operation are used, depending on specifications for the workpiece: (1) Degassing in the ladle. (2) Degassing by percolation. (3) Casting of ingots weighing up to 150 tons in a vacuum.

When degassing in the ladle, filled with steel and slag, is placed in the vacuum tank and the tank covered. The tank is pumped out using full pumping capacity in order to reach maximum vacuum in shortest possible time. About 5 minutes are required to obtain 30 Torrs using eight pumps. At this magnitude a thorough degassing is started.

Permits limited degassing

The freed gas, as seen through the quartz glass windows, makes its way through the slag. In a short time, the blackish slag layer boils violently. This boiling stops as soon as air is permitted to enter after completion of the evacuation. While this process is relatively simple, it permits only limited degassing and is not suitable for all purposes.

When degassing by percolation, the casting ladle stands in the previously evacuated vacuum tank. Packing of the tank for pouring the steel is done by means of a plate of aluminum which is melted through when the steel is poured on it.

The transfer by pouring takes, depending on the quality, approximately 8 minutes, with a load of about 40 tons. In the process, temperature of the steel is reduced by about 30°C. To avoid undue heating of the steel in melting, which would tend to increase gas content, several special tap ladles have been developed. The evacuated steel, with its contents of hydrogen and other gases considerably decreased, is then cast under normal air pressure. This treatment is given to special high-alloy cast steel grades, including silicon steel for electrical use.

Of special interest is the casting of ingots weighing up to 150 tons in a vacuum, for use in production of heavy forgings meeting the specifications for inductor shafts, turbine rotors and similar power plant parts.

On entering the vacuum, the casting steel is more or less torn apart, depending on the size of the vacuum, the diameter of the steel stream

and the speed of casting. In standard casting, under normal air pressure, an effort is made to obtain a compact metal stream. When casting in a vacuum, it is desirable to divide the casting jet into many individual drops. The drops expand and explode, giving off a large part of the gases. This action has been verified in high speed motion picture films, taken at 1800 to 5000 frames per second.

In normal casting operations the foundry crew is exposed to strong heat and obnoxious, dense smoke. In the vacuum casting operation heat is held in check by the closed tank and insulated cover. Smoke and fumes generated during pouring are sucked off. Working conditions are considerably improved and progress of pouring may be watched closely through the quartz glass windows and carefully controlled. The elimination of long cooling periods has helped reduce in-process inventory.

Modern temperature "feelers" are used in checking the steel. At 200 and 600 mm above the ladle bottom, platinum and platinum-rhodium thermo-elements in special metal-ceramic protective tubes have been installed in the ladle wall. Measurements are made by means of a tube amplifier and a photo-cell compensator. The temperature of the steel in the ladle can be closely watched during the entire casting operation.

Analyses of gases sucked off during vacuum casting, indicate oxygen has practically disappeared, largely eliminating oxidation as a factor in casting. Based on many tests, the following average gas contents have been found:

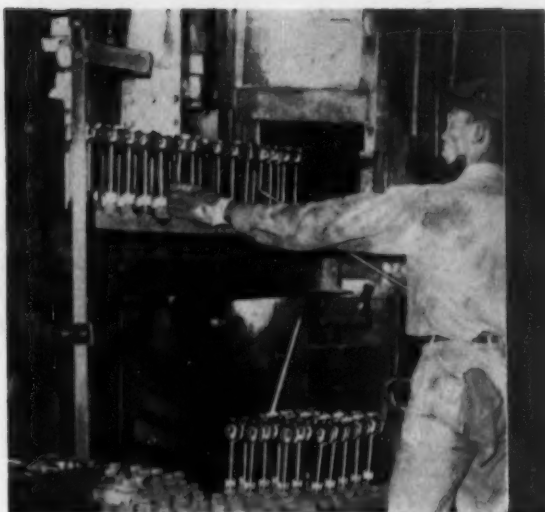
	Approximate Pct by Vol.
Hydrogen (H ₂)	20
Carbon monoxide (CO)	45
Carbon dioxide (CO ₂)	5
Nitrogen (N ₂)	Balance

As a further example of the degassing of a 100 ton ingot, ready cast by means of an ingot-head heating device, the following additional gas quantities shown in the table were found after replacing the cover.

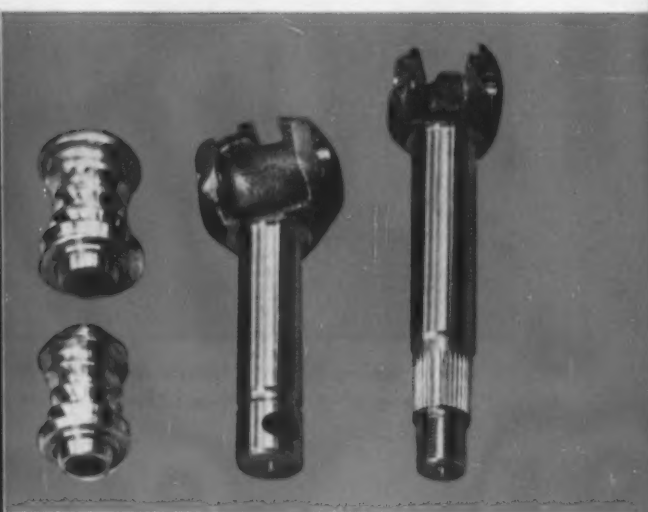
In checking the effectiveness of the many steps taken to achieve the desired results it was necessary to use as exact a method of analysis as possible to determine the quantity of hydrogen contained in the steel. Since the steel in congealing, loses part of its hydrogen, it is necessary to know the amount of hydrogen contained in the liquid melt.

A liquid sample is taken from the steel bath with a spoon, shortly before tapping the furnace. About 3 cu cm of steel are sucked off by means of a quartz pipette and the sample immediately placed under a mercury seal. The hydrogen normally released during cooling is retained and may be considered in analysis give an objective picture of the measures taken.

Test hardness 100 pct—



GREEN machined parts are loaded onto fixtures, washed and charged into the furnace.



STEERING gear components which are hardened on a continuous basis and hardness-tested 100 pct.

Continuous Carbonitriding Setup Promotes Safety, Uniform Quality

♦ By integrating an atmosphere hardening furnace with an automatic quench and wash and draw Gemmer Mfg. Co. is achieving high-quality, uniformity and safety in the production of steering gear components . . . All parts are Rockwell hardness tested when they are unloaded from work-handling fixtures.

♦ Once parts enter the hardening furnace they must go through the draw furnace to be removed from the heat-treating setup . . . This assures that no brittle parts can be sent to the finishing department.

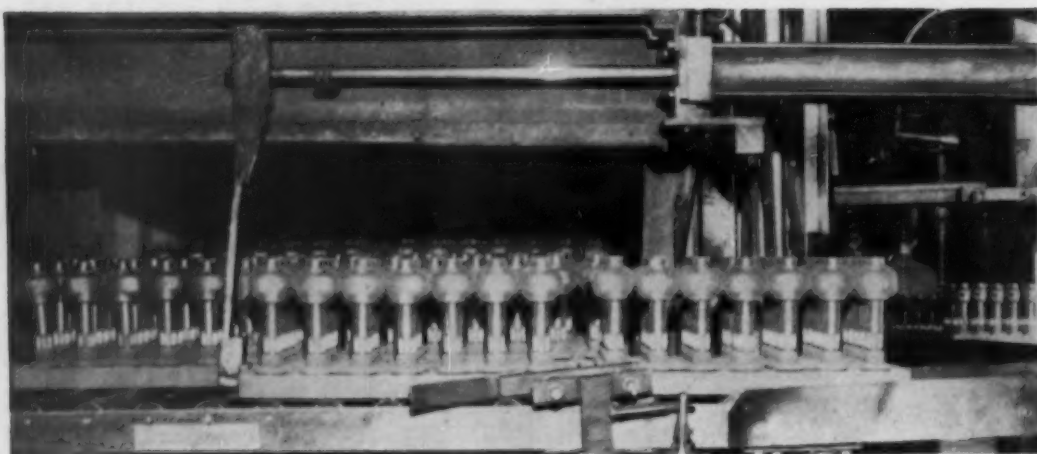
By R. J. BELZ,
Materials Engineer,
Gemmer Mfg. Co.,
Detroit

♦ A UNIQUE carbonitriding installation at Gemmer Mfg. Co., Detroit, provides complete quality control as well as vital safety features in heat treating steering gear components. The setup integrates two washers, hardening and tempering operations with a 100 pct Rockwell testing program.

The tempering furnace is in line with the hardening furnace so that once parts enter the furnace they are handled automatically throughout the entire heat treating operation. Automatic handling during tempering guarantees proper tempering conditions and allows no brittle parts to leave the heat treating department.

Part carrying fixtures travel on conveyors through the entire cycle. At the furnaces one man handles all operations while another tests the parts for hardness and unloads the fixtures.

Gear shafts and steering gear worms are heat treated to tight specifications for case hardness depth and equally exact core hardness. This is



PARTS leaving the draw furnace are pushed to a conveyor which carries them to testing station.

done in a continuous pusher type atmosphere controlled radiant heated furnace and recirculated air-type draw furnace built by the Surface Combustion Corp., Toledo, Ohio.

Green parts arrive at the furnace in tote boxes on gravity roller conveyors and are manually loaded into tray fixtures for processing. The base trays, 14 x 22½ in., are loaded two at a time into the two-row pusher furnace.

Since the parts are covered with oil and chips, the fixtures are first elevated and placed on a roller conveyor which carries them two at a time through a spray washer.

After the washing the fixtures are withdrawn and transferred to a holding table. The holding table provides a means of transferring the trays from the cradle which transports them in and out of the spray washer to a second cradle for transporting the trays into the furnace vestibule. Thus, while the operator is loading the trays with stock, two trays are being washed and two trays are on the loading table in readiness for charging the furnace. This arrangement allows the operator to perform all his functions from one position on the loading platform.

Work movement, furnace synchronized

After the two trays are loaded into the vestibule, all movement of the work from this point on is synchronized with the automatic cycle operation of the heat treating unit.

A hydraulic pushing mechanism advances the trays from the charge vestibule to rails in the furnace chamber and at the same time pushes the two rows of trays within the furnace forward by one tray length. Thereby, the two trays at the discharge end are advanced to a position for withdrawal for quenching.

At this point in the cycle, pull out bars enter the furnace and slide under the trays, raising

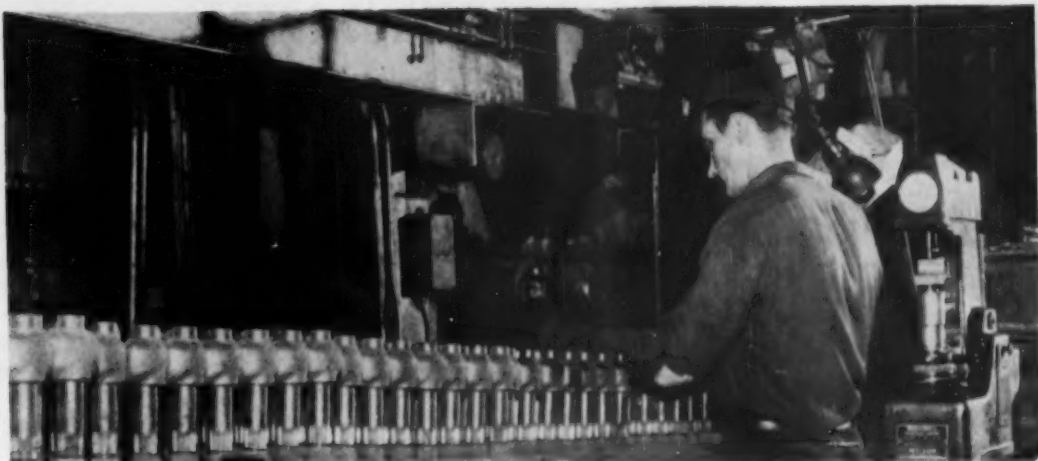
them off the rails. On withdrawal of the bars the trays are deposited on a lowerator, in the discharge vestibule, which lowers them into the oil quench tank.

Since the lower part of the discharge vestibule extends below the oil level in the tank, the hot work is protected from oxidation by a reducing atmosphere in the vestibule. Two rows of four trays each move progressively on rails across the bottom of the tank towards an elevator.

This action is integrated through a chain drive with the motion of the pull-out bars as they enter the furnace to pick up the trays. The elevator and lowerator remain at the bottom of the tank while the bars are moving into the furnace. At the same time the tank transfer mechanism is removing the trays that are on the lowerator from the previous cycle while depositing two trays on the elevator.

Upon completion of this motion the elevator brings two trays up from the oil and the lowerator moves upwards to receive the trays from the furnace. The carriage which moves the pull-out bars, upon their retraction from the furnace pushes the trays, with quenched parts, from the elevator onto the rails at the entrance to a spray washer for oil removal. This action also moves two lines of trays progressively through the washer and through a recirculating air draw furnace.

When the fixtures are pushed out of the draw furnace they pass onto a gravity roller conveyor which runs at right angle to the furnace. A lever is tripped by the fixtures and a hydraulic ram pushes the work forward on the conveyor to the Rockwell machine operator. The cycling of the furnace is such that the Rockwell test operator has ample time to remove the pieces from the fixtures, make the hardness test and place the tested part in tote pans that carry the work



ROCKWELL machine operator tests parts as they are removed from the furnace fixtures.

either to bank conveyors for live storage or to the subsequent grinding and finishing operations.

After the hardness test, the empty trays return to a storage point on the gravity conveyor where they are available for reloading and recycling through the furnace. All conveyors outside the furnace are gravity roller type. Except for the quenching operation, movement through the quench tank and elevating to the washer all of the fixtures push against each other in their forward movement.

Operates on 9 minute cycle

Because of the automatic handling, none of the actual heat treating operation is subject to the usual opportunities for human error.

Other features of this heat treating setup contribute to the uniform quality.

The furnace setup operates on a 9-min. cycle and completely hardens and draws 1600 lb of steel per hour. Two zone control of hardening temperatures are used. The first or charge zone operates at 15°F lower temperature than the second or quench zone. The hardening cycle takes 3 hours and a case depth of 0.008 to 0.012 in. is obtained.

Gear shafts are made of AISI 5130 forgings quenched from 1540°F and drawn at 975°F with a 1½-hour draw cycle. This heat treating cycle produces a core hardness of 25 to 35 RC. The composite surface hardness is 35 to 45 RC. Case hardness is R15N 85 to 87.5.

Worms are made from AISI 5132 or 5135 stock. These are quenched from 1525°F and are drawn at 400°F for 1½ hours. Core hardness on the worms is 43 to 48 RC and the composite surface hardness is 56 to 60 RC with a case hardness of R15N 89.5 to 91.5.

Atmosphere for this furnace is generated in a Surface Combustion endothermic unit with a

capacity of 2400 cfh. of RX gas. Protective and purge gas is piped directly from the generator to the charge vestibule of the furnace. In the hardening chamber RX gas, enriched with methane (natural gas) is mixed with anhydrous ammonia. The methane is mixed with the RX gas before it enters the furnace and the ammonia gas is directly introduced into the furnace at several points.

Proper circulation of the atmosphere around the work to assure uniform case depth is accomplished by fans located under the furnace rails. The fans are located one in the first zone and one in the second zone. Heating is accomplished by 11 "W" type radiant heaters and the action of the fans give speed and uniformity to the operation. Temperatures at all locations are controlled from a central point at the loading end of the furnace. The operator can set or change any of the temperature controllers from his position on the loading platform.

Strip chart recorders are used to make a permanent record of the operations. To further guarantee the accuracy of all the work that passes through the heat treating equipment, daily checks of case depths, microstructures, and core hardnesses are made by the metallurgical department. The accuracy of temperature control and furnace atmosphere composition is also assured by daily determinations with laboratory instruments.

Gemmer Mfg., pioneers in quality steering mechanisms, rate safety as the most important feature of their product. The 100 pct Rockwell program is a standard requirement to make doubly sure of physical properties. The company feels that with this setup the cost of checking these parts is being done at minimum cost since they must be handled at the unloading end of the furnace regardless of testing.

New Stud Driving Machine Eliminates Need For Tapping Cored Holes

◆ Studs can be driven into diecastings at rates up to 20 pieces per min on a recently developed multiple-spindle, stud driving-tapping machine . . . Tapping of cored holes is eliminated . . . All spindles are operated simultaneously.

◆ An automatically functioning drive chuck holds studs securely and prevents damage to threads . . . Cored holes can be at compound angles . . . Use of plastic steel liners permits overnight fixture tooling.

By W. G. PATTON, Ass't. Technical Editor

◆ A NEW, multiple-spindle stud driving machine, under research and development for the last 2 years, has recently been announced by the Ajax Mfg. Co., Detroit. The machine can also be converted into a high production multiple-spindle tapping unit.

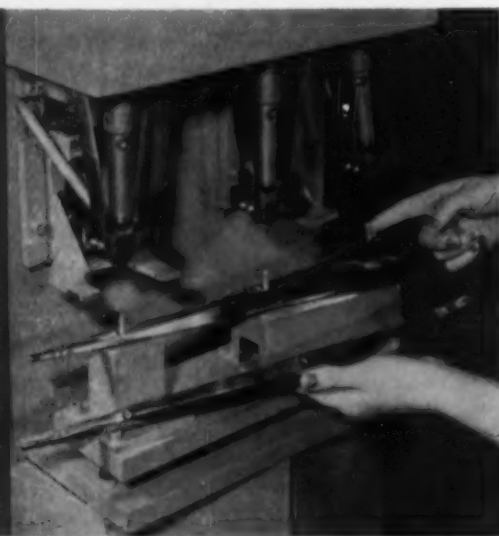
The new machines which are now going into

production and will become available to industry drive three studs at a time into a V-8 engine emblem for a leading automobile manufacturer at rates up to 20 pieces per min. Drive is positive and accurate. The necessity for tapping cored holes in the die castings is eliminated.

Syntron automatic feeders are used to supply



FIXTURES for multiple stud driving are made of a combination of plastic and steel powder having selfhardening characteristics. Hardening occurs without distortion or shrinkage.



DIECASTING before and after driving three studs simultaneously. Note angular position of driving heads required to accommodate holes at compound angles. Threads are not damaged.

studs to special driving chucks. Studs are picked up by the automatic chucks, and driven to the desired depth. All studs are inserted simultaneously without damaging the threads.

Production rate for the new machines is said to be at least 6 times as fast as the method previously used in which it was necessary to tap the stud holes individually and insert studs one-at-a-time.

Advantages of the new stud-driving machines may be summarized as follows: (1) studs are driven rapidly and uniformly to depth at an unusually high rate, (2) any combination of stud driving and tapping operations can be handled, (3) operations on all spindles are synchronized, (4) cored holes can be at compound angles, (5) the hydraulic power cylinder can be placed either horizontally or vertically in a manner that will not interfere with the operation of the spindles, (6) using a new tooling technique, accurate holding fixtures can be built or repaired in a few hours.

Fixtures already in service on a 3-spindle stud-driving operation have produced over 50,000 pieces without requiring repair or maintenance.

The machine cycles automatically after pressing a floor button. Studs are fed automatically into the driving chuck which moves into position, drives the stud to depth, releases automatically and returns to loading position.

To accomplish the job of stud driving at two or more locations requires perfect synchronization. The Ajax machine uses racks and pinions driving a hardened steel lead screw through a threaded bronze nut.

Each Ajax machine is designed to fit the job. A typical machine have 3 stud-driving heads utilizes a 2½ in. hydraulic cylinder, operating at pressures in the range of 600 to 700 lb. In the operation shown in the accompanying photograph, three ¼ in. 20-thread studs are being driven a distance of ¾ in. into the cored holes in a die casting. Driving pressures and stud or tap sizes can, of course, be changed to fit the job.

Accuracy in the rapid functioning machine is assured by (1) rigidity of the machine, (2) accurate grinding of the lead screw to match the stud or tap, (3) accurate location of the part in the fixture. Depth on tapping can be held within ± 0.002 or studding to ± 0.005 in., according to Ajax engineers.

Studs can be driven in holes at compound angles if desired by (1) tipping the part, (2) changing the mounting of the stud driving or tapping tool, (3) using a bevel gear setup or a universal joint. The choice of mountings and driving mechanism will depend on the design of the part, the number of operations and other factors.

Synchronization is assured by mounting racks and pinions on a single plate or plates which are actuated simultaneously by the compound hydraulic power cylinder. Racks and pinions are in contact at all times during the up and down stroke of the machine. This positive action

causes the driving heads or taps to feed or withdraw simultaneously and smoothly from all of the holes in the die casting.

The new machines have been used extensively on a number of zinc die castings. Indications are that the new setup will work on most types of nonferrous materials but not on steel.

Studs are fed automatically by a Syntron vibration-type feeder. On a typical operation involving ¼ in. studs ⅞ in. long, 5 in. diam Syntron units are employed for each stud line.

After moving up the ramp in the feeder, studs feed through a tube into a releasing device which feeds one stud at a time. Studs reach the special driving chuck through a tube. Two split-type feeding fingers position the stud which is held by spring pressure.

Moving down from above, the driving chuck picks up the stud and makes the required number of turns. At this point, the automatic chuck locks in position and stud driving begins and continues to depth. The downward motion of the driving chuck reverses, the chuck releases and returns to starting position.

Limit switches and other devices insure proper sequence of operations and guard against damage to the machine. In the event that the part is not properly seated in the fixture the machine stops automatically. During the downward stroke the split-type feed fingers open up to permit the driving chuck to pass through.

Plastic steel fixtures

Electric power unit required for the machine ranges up to 7½ hp. The motor selected will depend on the number of operations to be performed, the type of operation or operations and the materials involved.

The hydraulic system is designed to eliminate dwell time at the bottom of the stroke. Operating pressure is maintained at the desired level by a pump rated at 18 gpm.

Multiple tapping machines built by Ajax have had strokes ranging from 14 to 24 in. Holes have been tapped to a depth of ¾ in.

Fixtures for the new multi-stud driving and tapping machines are made quickly by using Devcon Plastic Steel, a combination plastic and steel powder material that hardens with minimum distortion or shrinkage.

A sample part is coated with a release agent, located properly in the fixture and impressed into the soft material. The sample part remains embedded in the fixture material for several hours. After permitting the Plastic Steel to harden, the fixture is ready for use.

In addition to eliminating any machining operations and providing an accurate fixture that does not scratch plated die castings, fixtures of this type can be produced quickly at comparatively low cost.

Tensile strength of the plastic material which is backed up with steel is 10,000 psi. Compressive strength is 15,000 lb Rockwell hardness, F. scale, is 75 pct.



FOUR double-contour magnetic rolls simplify drag out from zinc pot despite dust, drippage.

Faster pickup—

Permanent Magnets IMPROVE PIPE PROCESSING

♦ Classification of steel products during manufacture and inspection can be simplified through the use of permanent magnets . . . At Wheatland Tube Co. they are used extensively for conveying and hold-down applications.

♦ Advantages claimed from wide use of permanent magnets in the plant include faster pickup and more positive movement of pipe on conveyor lines . . . Reduction of conveyor length on approach to black pipe coating booth was also possible.

By J. B. DELANEY, News-Markets Editor

◆ **PERMANENT** magnets are being adapted to an increasing number of applications in steel processing and fabricating.

Their principal use has been to facilitate material flow and to simplify classification and separation of steel products during manufacture and inspection.

Wheatland Tube Co., Wheatland, Pa., now winding up a 2-year modernization and expansion program that includes a complete revamping of material handling and equipment lineup to minimize cross-hauling and crane lifting, is making extensive use of Eriez permanent magnets for conveying and hold-down applications.

Wheatland, a producer of pipe and tubing for 25 years, points to these advantages:

- Faster pickup and more positive movement of pipe on conveyor lines.
- Reduction of conveyor length on approach to black pipe coating booth.
- Reduction of damage to galvanized pipe by eliminating slippage and consequent reduction of roll speeds.
- Solution of pipe movement problem, which was destroying effect of a compressed air blow-out pattern.
- Elimination of the need for five $\frac{3}{4}$ h.p. motors on pipe plain-ending operation.
- Elimination of pipe bounce which was interfering with efficient operation of flag switches routing pipe to hydrostatic testers.
- Efficient and relatively trouble-free operation in galvanizing drag-out application — a hot, dusty operation complicated by zinc drippage.

Solve slippage problem

If permanent magnet rolls had not been installed in the plain-ending operation, eight driven friction rolls—four on each of two machines would have been required to advance the pipe to gage stop. At the same time it would have been difficult to hold the pipe against the stop.

With one magnetic roll for No. 1 machine and two for No. 2 machine, the company was able to eliminate motor drives on five friction rolls and hold pipe against gage stops. Production also improved over other installations to an average of 23-24 pieces per min compared with 18-19 previously.

On the straightener feed conveyor the company was having trouble due to blowed pipe from the hot mill cooling rack. Three magnetic rolls, at least two of which are in contact with the pipe, solved a serious problem of slippage.

A small permanent V-magnet solved the problem of pipe movement on $\frac{1}{2}$ in. and $\frac{3}{4}$ in. sizes during the compressed air blowout. The smaller pipe sizes had a tendency to move during the blowout destroying effect of the clean-out air pattern. The small magnet exerts enough force to prevent movement.

Wheatland installed two magnetic rolls on its inspection take-away conveyor to get pipe



DRIVEN friction rolls were reduced from 8 to 3 on plain-ending operation by using magnet rolls.



SMALL permanent magnet acts as hold-down to prevent pipe movement during blow-out operation.



LESS vibration and no slippage occurs with permanent magnets used on take-away conveyor.

"Four double contour permanent magnet rolls are providing satisfactory service on the galvanizing drag-out despite high temperature (850°F), dust, and zinc drippage . . ."

in motion and up to speed quickly due to the importance of speed to the consistent operation of kickoff limit switches. Two additional rolls spaced 30 ft apart give further insurance against speed loss due to slippage. A fifth magnetic roll prevents bouncing and minimizes vibration to assure positive engagement with flag switch.

One magnetic roll was enough to assure constant speed on the approach conveyor to black pipe coating booth — an important factor in achieving desired coating thickness and distribution. As an added bonus, the company was able to cut conveyor length from roughly 40 to 20 ft with better results. The extra length had been necessary to compensate for slippage when only friction rolls were used.

Less damage on galvanized

Depending on size of pipe being coated, Wheatland moves one, two or three lengths through the coating booth simultaneously. At present it is using a mechanical method to separate multiple lengths as they move into the booth. But it has found that a sheet-fanning permanent magnet will provide more positive separation, and plans to replace the mechanical system with the sheet fanner.

Four double contour permanent magnet rolls are providing satisfactory service on the galvanizing drag-out despite high temperature (850°F), dust, and zinc drippage.

Damage to galvanized pipe on a take-away conveyor was eliminated by inserting two magnetic rolls. Previously, slippage of friction rolls was damaging the zinc coating and ends were damaged by striking the deflector at excessive speed. With slippage eliminated and speed reduced, both problems were overcome.

Permit slower roll speeds

One magnetic roll on the galvanized pipe inspection take-away conveyor practically eliminated down time caused by drive chains falling from sprockets in a complicated materials handling arrangement. The magnetic roll made it possible to achieve desired results at slower roll speeds.

Plant Engineer Joseph Rossi described Wheatland's modernization program as one of tying together all operations as closely as possible for increased efficiency and to provide for future changes that might be necessary to speed production.

The program included construction on a new building 55 x 650 ft; relocation of a 150 x 50 ft section of an existing building; construction of two truck ramps in the shipping department; a new boiler house; installation of a new straightener; a screw-type conveyor; installation of a new plain-ending machine; installation of 300 ft of conveyors, and installation of a radiant heating system, using Wheatland Tube 1¼-in. butt-weld black pipe for the grids.



MAGNETIC rolls cut downtime due to chain-drive trouble on galvanized inspection conveyor.



SCREWSTICK is pushed through air-powered driver.

With power drivers—

Screws in "Stick"

Form

Cut Assembly Costs

◆ **ASSEMBLING** and fastening small parts quickly enough to complete 250 "Fix-It" model convertible cars per hour was a stiff challenge to Ideal Toy Corp.'s production engineering department. Dozens of assembly operations are involved on the miniature Detroit assembly line for these popular toy cars.

To step up production the firm recently installed air-powered Screwstick drivers at each assembly station. With the new equipment only one employee is needed at each line station to do the necessary positioning and fastening. This work formerly required two people.

As the name implies, Screwsticks are sets of similar size screws fabricated in stick form by the American Screw Co., Willimantic, Conn. They are made so that the point of each screw is joined to the head of its neighbor by a small neck of metal. The entire stick is inserted in the power driver.

As each screw is power driven to the required depth the small metal neck breaks off and the next screw is indexed into driving position.

In Ideal's former assembly method, with two operators at each assembly station, one operator positioned the parts and the second operator fastened them. The screw driving tool was stationary so that it was necessary to move the assembly to a different position under the driver for each of the eight screws driven. This constant moving for correct positioning slowed production considerably.

Advantages of the new drivers are their compactness, lightweight and portability. They are made for one hand operation, so that a single person can position parts with one hand and drive-fasten them with the other. The average

operator drives about 1500 screws per hour.

The new technique not only improved assembly efficiency and product appearance. It also allowed screws to be used in locations that were inaccessible with awkward hand placement.

In many of these inaccessible spots it was necessary to cement parts together. This posed an impossible salvage problem. Finished toys with broken or damaged parts were frequently scrapped because it was too costly and difficult to repair them. But with Screwsticks, damaged parts can be removed easily and replaced quickly.

All of the Screwsticks currently used at Ideal for the toy car and various other toy assemblies are made of brass. However the sticks are available in steel, aluminum and nickel silver alloys as well, in both the machine screw and thread forming type. Each stick has 24 to 60 screws.



OPERATOR positions parts with one hand, uses the other to power drive 1500 screws per hour.

Research Points Way to New Methods of Preventing Galling and Seizing

♦ Better ways of protecting metals in contact from galling and seizing may result from recent basic research studies . . . Characteristics of bearing surface films and choice of bearing metal play a big part in resistance to galling and seizing.

Part II

By E. S. MACHLIN,
Associate Professor of Metallurgy,
Columbia University, New York

♦ A NEW UNDERSTANDING of the causes of galling and seizing of metal surfaces have resulted from research recently made at Columbia University's School of Mines. The research program was sponsored by the Wright Air Development Center.

Studies were made of the relationship of solid phase weldability and the ratio between the work of adhesion and the work of cohesion. Results with an Ag-Fe couple which did not show agreement noted with other couples, led to a series of friction coefficient measurements on clean surfaces as a function of temperature. These results, Figs. 1, 2, and 3, are reproducible in that the values with temperature increasing were checked with temperature decreasing. The reason for the disagreement for the Ag-Fe couple in Table III is now apparent. At room temperature the Ag-Fe couple has limited solid phase weldability. At 700°F its weldability is quite marked. This temperature dependence of the Ag-Fe friction coefficient is very reminiscent of the increasing tendency of Ag-Fe bearings to seize if operating temperature becomes too high.

Part I of Prof. Machlin's two-part article, covering liquid and solid phase welding and the part protective layers play in galling and seizing, appeared in last week's issue of *The Iron Age*.

Effect of Lead and Copper on the Surface Tension of Silver

Specimen	Surface Tension ergs/cm ²	Atmosphere
99.9 Pct Ag	965 ± 50	Hydrogen
Ag (1 atom Pct Pb) alloy	785 ± 25	Hydrogen
Ag (1 atom Pct Cu) alloy	1000 ± 50	Hydrogen

Other couples, Figs. 2 and 3, exhibit no or little temperature dependence of the friction coefficient. The Ag-Fe result indicates the fraction of contact area which is solid phase welded increases with increasing temperature. This does not indicate a greater cleanliness with temperature in this sequence of tests because all specimens are equally clean. An Ag-Cu couple showed no temperature dependence of the friction coefficient which was high for all temperatures.

The list of couples (see Part I) by no means covers all metal combinations, hence other couples of limited solid phase weldability may exist. It can be concluded that most metals tend to solid phase weld and hence to seize with the known exception of Ag to Fe at low temperatures and perhaps some others. Consequently, except for the latter couples resistance to seizure and galling must be introduced at the surfaces by protective films.

Some elements in solid solution tend to segregate at surfaces or interfaces of the matrix. This tendency is called the surface adsorbability of the solutes. There are at least two possible effects of an adsorbed layer on the solid phase weldability of the adsorbed surface to some other given metal surface:

(1) The surface adsorbed layer has satisfied important surface attractive forces and con-

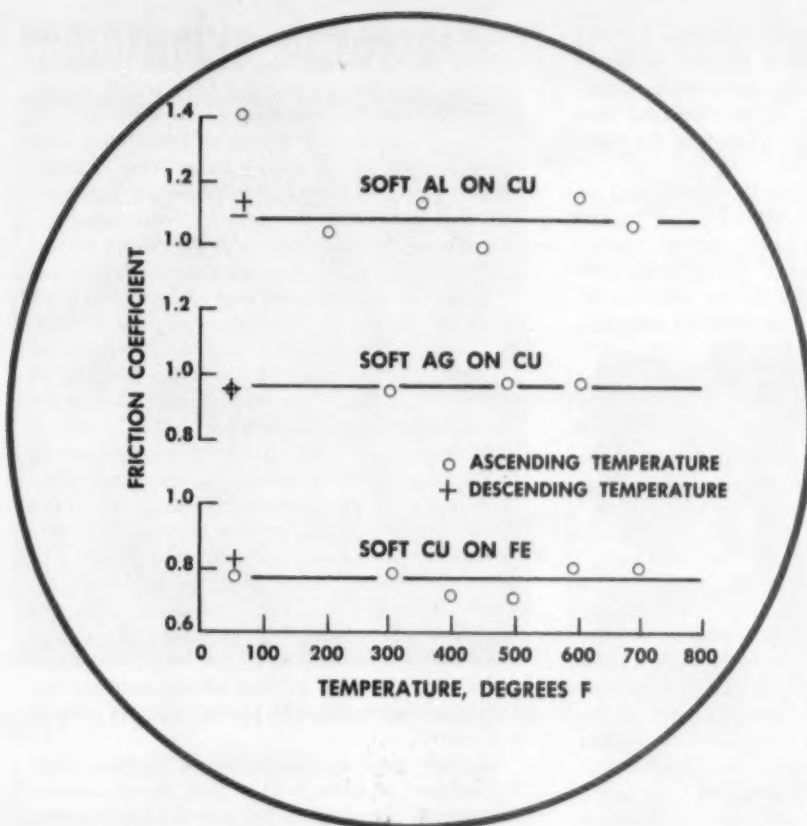


FIG. 1—Temperature dependence of friction coefficient, completely weldable couples.

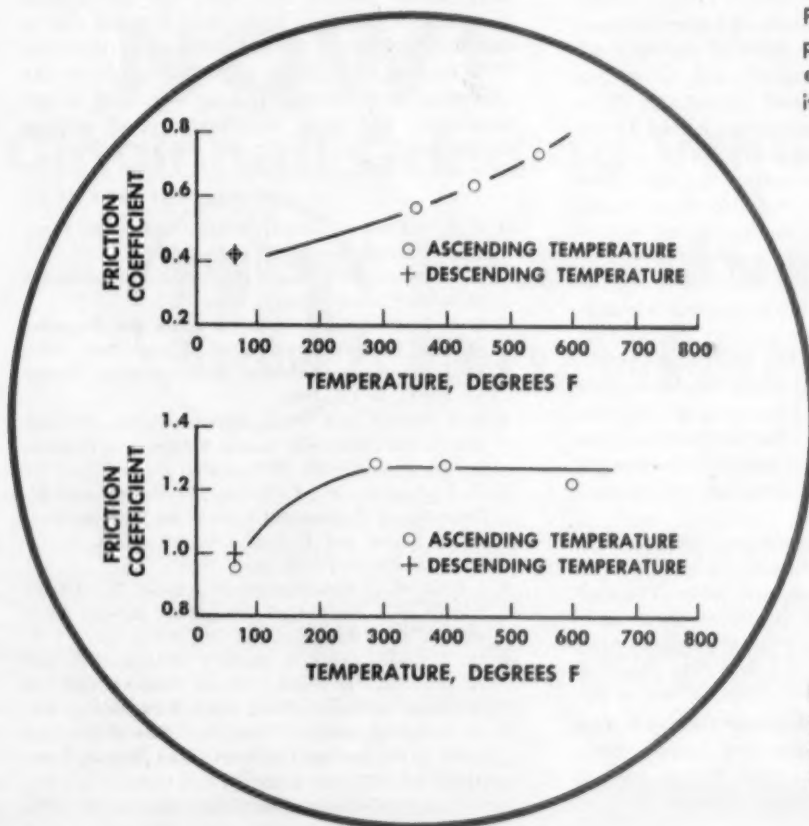


FIG. 2—Temperature dependence of friction coefficient, couple of limited weldability (Ag-Fe).

FIG. 3—Temperature dependence of friction coefficient, couple of partial weldability (Al-Fe).

ferred an anti-welding character to the surface.

(2) The surface adsorbed element tends to oxidize or nitrogenize or sulphidize more readily than the matrix so that an anti-welding protective film is more easily attained in the alloy than in the pure metal.

Anti-seizability and galling resistance may be enhanced if the protective film formed by the surface adsorbed layer more readily resists abrasion and break through in sliding wear than that on the pure metal. Also, if the bearings or equivalents are operated at an elevated temperature, the possibility exists of healing a clean area (a lack of protective film) by diffusion of the adsorbing element from the matrix to the surface. This action is normally not present in the bearings in use today. This type of attack on the solid-phase seizing and welding problem is being investigated. To date, it has been possible to show that solid phase welding is a function of surface absorption of elements from solution.

In one such manifestation of this effect, a silver base was used as the matrix. Two alloying elements were used. Lead tends to adsorb strongly on silver surfaces and the other, copper, has little or no tendency to adsorb. The surface adsorbability was determined from measurements of the effects of these elements on the surface tension of liquid silver. Data were obtained from sessile drop measurements using a standard technique.⁹

The effect of Pb is to markedly decrease the surface tension of silver. The effect of Cu is nil on the surface tension of silver. Hence, Pb adsorbs and Cu does not adsorb on silver surfaces. Friction coefficients of a number of control specimens were measured against pure silver and silver alloys containing small amounts of Pb or Cu in solid solution.⁶ These data showed Pb appeared on the silver surfaces and Cu did not.

The friction coefficients against the silver alloy containing Pb were more similar to those against pure Pb than against pure Ag. These experiments were checked with a copper-silver alloy with similar results. That is, silver adsorbed on copper surfaces and thus brought about a change in the nature of the copper surface. In this case, silver forms an oxide more readily than copper and adds to potential anti-seizability of copper.

Adsorption of elements from solid solution can lead to the formation of protective surface films. Further investigation may lead to development of new anti-seizing combinations as well as wear resistant protective films.

Very little work has been done to measure the "protectiveness" of surface films in the realm of solid phase welding, seizing and wear. The fact that most bearing surfaces derive their anti-seizing or anti-wear properties from these films would indicate that research on this phase is worthwhile.

Only a few principles have been developed with respect to the "protectiveness" of surface films. One principle is that the surface film should not be too much harder than the underlying matrix.

If the surface film is much harder than the matrix then a normal load would tend to crumble the film to produce a surface from which jagged abrasive particles protrude.

This principle, first stated by Dies,¹⁰ has been corroborated by practical experience. Pistons made of magnesium alloy² produce far less scoring and tearing of the cylinder liner than aluminum alloy pistons. Tin which has a soft matrix and a much harder oxide produces heavier wear of a hard chromium steel disk than a hard steel slider on the same chromium steel. This investigation has shown similar results. For example, in the friction runs in air the rider tends to be self cleaning. Hence, the friction coefficient in air depends on the nature of slider's film.

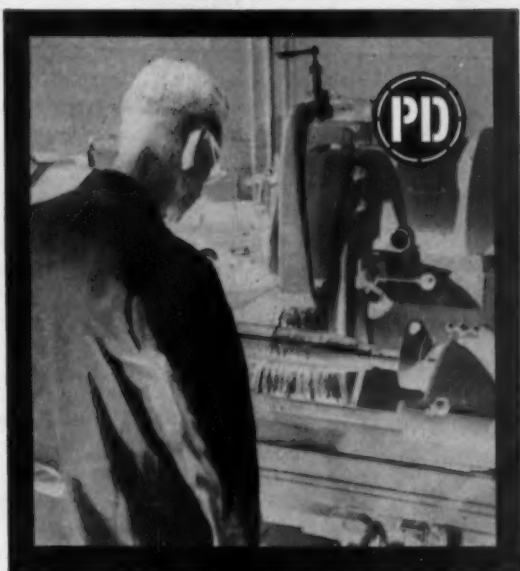
As shown in Table I of Part I the decrease in friction coefficient on changing the atmosphere from argon to air increases in magnitude in the order titanium, iron, silver, copper. The difference in Moh's hardness between oxide and underlying metal is 3, 2, 0, 0, for this same sequence. That is, the silver and copper oxides are more protective on their respective metals than titanium or iron. Increasing the hardness of the underlying titanium or iron should improve the ability of their oxides to protect against seizure and wear.

Another principle with regard to the "protectiveness" of films is that they should adhere strongly to the underlying matrix. Little work has been done on this subject. Most oxides which have molar volume less than the underlying matrix on which they form, tend to crack due to the development of tensile stresses in the film. This tendency to crack, although bad from the viewpoint of protection against oxidation, is not necessarily bad from the viewpoint of seizure protection.

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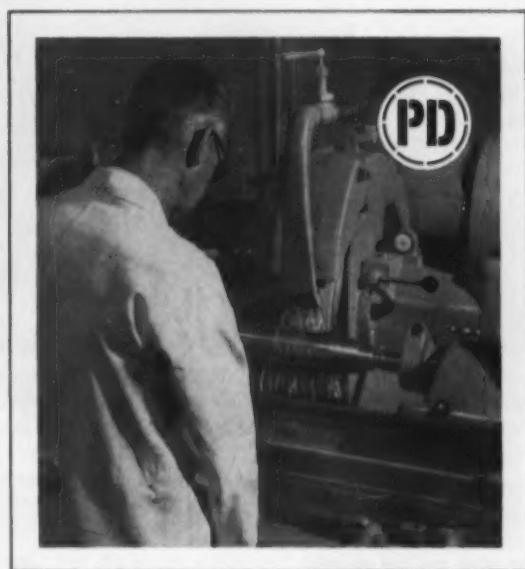
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New Technical Literature:

Catalogues and Bulletins

Press brake

The Di-Acro press brake is covered in this new folder. The brake is hand operated, develops 8 tons of pressure and uses standard press brake dies. It can perform simple angle and radius bends as well as curling, corrugating, flanging, hemming, flattening, punching, blanking, drawing, joggling, channel and box forming operations, according to the folder. Applications include model shops, experimental laboratories and production departments. Specifications and capacities are listed for further information. *O'Neil-Irwin Mfg. Co.*

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FOR YOUR COPY

Money-saving products and services are described in the literature bristled here. For your copy just circle the number on the free postcard, page 113.

Spur gear cutters

Newark automatic spur gear cutters are covered in this new booklet. The advantages of the cutters include their speed, accuracy, dependability and economy. Several

models are shown and their complete specifications are given. *Potter & Johnston Co., Pratt & Whitney Div., Niles-Bement-Pond Co.*

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Enamel

Staize-Clene enamel is the subject of this new booklet. Stressed is the fact that this enamel is completely odorless. Applications are shown. Advantages are discussed. Complete specifications are included. *Enterprise Paint Mfg., Co.*

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Humidity conditioning

Kathabar humidity conditioning is discussed in this new booklet. The conditioning is for waterworks, pipe galleries and pump rooms, according to the booklet. Among advantages stressed are its economy and the fact that it stops condensation all the time, simply and safely. The system is diagrammed and its advantages are discussed. *Kathabar Div., Surface Combustion Corp.*

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Low pressure cylinders

Low pressure cylinders, 650 psi maximum, are reported on in this new catalog. The cylinders are described and their advantages are pointed out. Features are discussed and shown. Specifications are included. *Nopak Div., Galland-Henning Mfg. Co.*

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Wire coils

Single length wire coils are covered in this new leaflet. Among advantages listed are savings in scrap loss, reduces material handling costs, longer continuous runs, less down time for production equipment. *Continental Steel Corp.*

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Machine tools

The machine tool service offered by Miles Machinery Co. is covered in this new booklet. Services include rebuilding, repair and reconditioning service for worn out machine tools, and buying used machine tools. Emphasized are the stocks the company has of new machine tools and rebuilt machine tools. *Miles Machinery Co.*

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Machining aluminum

Machining aluminum is the topic of this new booklet. It covers such problems as types and shapes of tools, preparation of drills, tool materials, tapping and threading, reaming, spinning, sawing, lubricants and the use of rubber to supplant expensive female embossing dies. *Metallurgical Dept., George Sall Metals Co., Inc.*

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Wire rope

The handling and care of wire rope is the topic of this new booklet. Contained are a listing of the common causes of wire rope abuse, a check list of conditions to avoid in order to obtain longer life, a variety of computations to find sheave and groove diameters, drum diameters, fleet angles, capacities of drums and reels, etc. *Bethlehem Steel Co.*

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Lift trucks

The Yale Zephyr hand lift truck is shown and described in this new bulletin. The truck which is light in weight, was designed for carrying loads up to 1000 pounds. The features of the truck are described. Specifications are included. *Yale & Towne Mfg. Co.*

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Dust control

Dust and fume control is the subject of this bulletin. Dust control systems, air conveying systems and systems for the removal of noxious fumes or excess heat are discussed. Custom built equipment is described. Facilities of the company are described. *Young & Bertke Co.*

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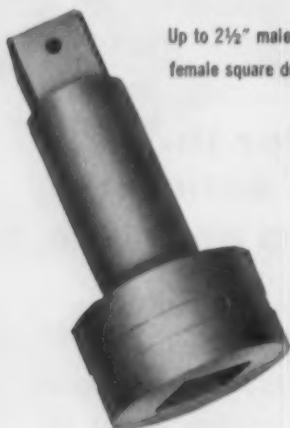
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Utility blowers

Hartzell's new non-overloading utility blowers with backward curved blades is presented in this new bulletin. Data is given for the complete line, including belt-drive blowers, direct-drive models, etc. Complete dimensions, specifications and performance data are given. *Hartzell Propeller Fan Co.*

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Stainless steels

Carpenter Stainless No. 20 and No. 20-Cb are described in this new catalog. Both the basic No. 20 alloy and the columbium-stabilized analysis are sulphuric acid resisting steels. Information on the steel's corrosion resistance, applications and working characteristics is included. Physical and mechanical properties are given. *Alloy Tube Div., Carpenter Steel Co.*

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Barrel finishing

Barrel finishing is the subject of this new instructional booklet. The manual describes the basic steps involved in making trial processing runs, and makes recommendations for selection of media and compounds. The manual also gives specific recommendations for barrel speeds, water level, time cycles and barrel loading. *Minnesota Mining & Mfg. Co.*

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Materials handling

Equipment which makes materials handling in the coal, steel and metalworking industries faster, cheaper and safer is described in this new brochure. The brochure describes materials handling equipment, ranging from extra heavy duty trailers with 250,000 pound capacities to motorized transfer cars to skid platforms, and standard and collapsible storage containers. Other equipment reviewed include side dumps, reversible trailers, dumps, dump trailers, scrap ballers, transfer cars, drop boxes, nesting rings, dumping boxes and platform trailers. *Phillips Corp.*

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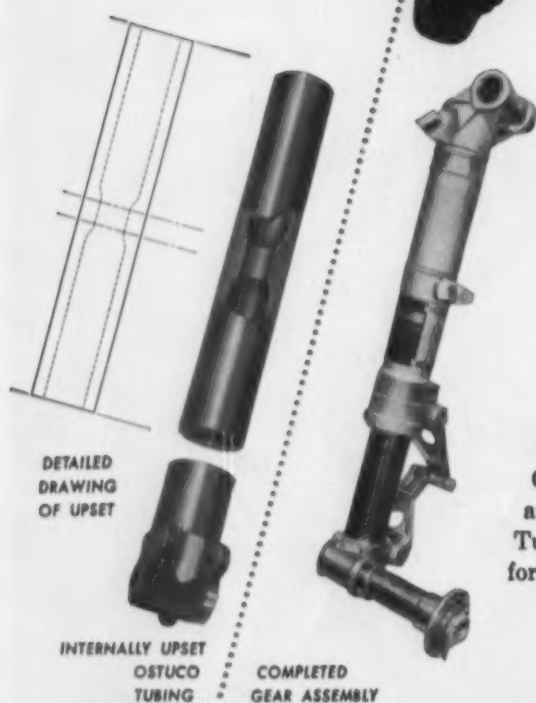
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This section starts on p. 108

Abrasive grain

Abrasive grain and powders for use in metal finishing is the subject of this new booklet. Topics discussed include properties of abrasive grain and powders, elements of metal polishing, preparation and care of polishing wheels, and general rules for good polishing. A suggested layout for set-up room and curing room is shown. Chapters cover metal buffing, metal tumbling, and pressure blasting. *Carborundum Co.*

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Stainless accessories

This comprehensive new guide and reference book provides specifications and engineering data on a broad line of stainless steel accessories. Included are bolts, nuts, screws, pipe fittings, valves, wire cloth, fabricated products, bar, sheet, rod and similar items. Special tables deal with analyses, corrosion data, and comparative properties of various types of stainless steel. *Schnitzer Alloy Products Co.*

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Facilities catalog

The stamping, drawing, forming and heading facilities of the Fabricating Div. of the Plume & Atwood Mfg. Co. are shown in this new catalog. The catalog also shows how by combining operations several items are now produced by P & A at substantial savings. *Plume & Atwood Mfg. Co.*

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Epoxy

L-940 flexible epoxy is covered in this new literature. The epoxy is a dimensionally stable flexible casting epoxy with exceptional impact strength, according to the literature. Directions are given for mixing the material. Specifications are included. *Rezolin, Inc.*

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Band saw

The Johnson Model M band saw on wheels is covered in this new leaflet. This tool eliminates all hand cutting of structural steel, pipes, conduits, angle iron, reinforcing rods, etc., according to the leaflet. Among advantages listed are time saving, cuts labor costs and prevents slow-ups. The portability of the saw is emphasized. Construction features and specifications are given. *Johnson Mfg. Co.*

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Torque limiting wrenches

Precision torque limiting wrenches and accessories are described in this new catalog. It describes 13 different torque wrench models, devotes a full section to sockets, adapters and accessories, and contains a comprehensive appendix of engineering information pertaining to torque control. Full specifications, ranges, weights and sizes are given. Conversion charts, recommended torque specifications for thread sizes, valuable formulae and torque information is given. *Jo-Line Tools, Inc.*

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Squaring shears by Wysong are covered in this new booklet. Among subjects covered are advantages of high tensile castings, blades, clutch, features, power shears, gauges, plastics and optional equipment. New standard features are shown and discussed. Equipment is shown and advantages pointed out. Complete specifications are included. *Wysong & Miles Co.*

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Straddle truck

The new 20,000 pound capacity Hyster straddle truck is announced in this new literature. The trucks are used in industries where heavy and bulky products are handled. The new unit, Model MD, is shown and described. Mechanical improvements include a 12-inch clutch, vacuum power brakes and heavy-duty hypoid differential. Additional features are a positive controlled, simplified swing mechanism, new load shoes and link rods and a new instrument panel. *Hyster Co.*

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Broaching machines

Dual-ram broaching machines designed by Colonial Broach Co. are covered in detail in this new bulletin. Tabulated in complete form is the specification data on 11 different machine models including two entirely new machines. Also presented in table form with an accompanying keyed line drawing are significant dimensions of each model. Pictures show the electronic and hydraulic control panel arrangements and the cooling filter systems employed in this series. Design details and features are summarized. *Colonial Broach Co.*

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Corrulux, a translucent structural panel, is the subject of this new bulletin. Many applications are diagrammed and discussed. Advantages include savings on engineering, framing, maintenance, cost and daylighting. Uses include ceiling panels, lighting fixtures, movable screens, shower stalls, carports, bath enclosures, awnings, sliding doors, and interior facings. Physical and chemical properties are listed. Specifications are included. *Corrulux Div., L-O-F Glass Fibers Co.*

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Jacks

Simplex lever, screw and hydraulic jacks and related products are included in this new catalog. Types of jacks discussed include anchor, bridge, cable, emergency, side lift jacks, reel jacks, trip jacks and spreader jack. The products are shown and their advantages are given. Specifications are included. *Templeton, Kenly & Co.*

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Plates and chucks

The construction and applications of the new Taft-Peirce Sine Angle Plates and Sine Angle Magnetic Chucks are given in this new catalog. These tools may be used for setting up angular work for machining or inspection operations. Plates and chucks are available in either the Simple or Compound Angle models. *Taft-Peirce Mfg. Co.*

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Three surfaces of part, in three planes, broached in this unusual setup . . . Sides straddle broached in single pass . . . Special tools, fixtures help speed operation.

Broaching three surfaces on a part in three planes during one machining cycle requires a versatile broaching machine, plus some unusual fixture and tool design. Producers of the part, a large automobile manufacturer, decided to use a Dual Ram machine made by Colonial Broach Co., Detroit.

The broached part is a transmission reverse band lever. Surfaces to be broached include the opposite sides of the lever boss, and an external V-shaped slot parallel to the axis of the same boss.

Both sides of the boss are straddle-broached in one pass. They

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

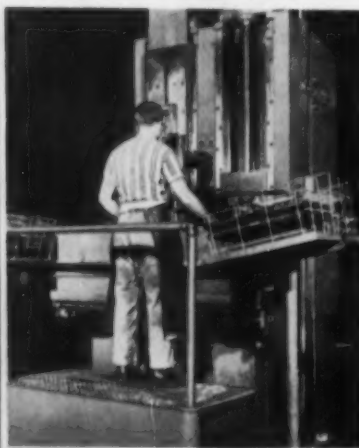
broach the 55° V-slot with a separate pass.

Critical part of the machining job involved locating the lever boss in its fixture so that the straddle-type broach would remove the same amount of material from both ends.

Since the geometry of the part did not permit locating anywhere else on the part, except at the faces to be broached, the locating device or reference points had to be removable to allow the double-faced broach to straddle the boss during the cutting stroke.



Broached three ways . . .



On versatile machine . . .

Sequence of Operations

To overcome this problem a fixture was developed that combined hydraulic clamping and automatic locating "fingers" that pivoted into and out of position with the shuttle motion of the broaching machine's work platens.

The production cycle sequence of operations consists of the operator placing the lever between the locating "fingers" for the straddle-broaching operation on the left ram and then clamping the part in place hydraulically. Next, the work platen with the fixture moves under the ram and the locating "fingers" are automatically drawn back from the part.

At the same time, the right-hand

TECHNICAL BRIEFS

platen shuttles back into loading position. The left-hand ram completes its broaching stroke and the one on the right moves into broaching position. A part is placed in the right-hand fixture and hydraulically clamped in place for broaching the V-slot. The right-hand platen shuttles into broaching position, and the V-slot is broached as the left-hand ram positions itself for the next cycle.

This combination of machine, tools and fixtures completes one part in one machine cycle. The straddle-broached faces are $1\frac{3}{8}$ in.

Research:

"Pint size" chamber developed for low temperature tests.

Scientists at the Research Laboratories of Westinghouse Electric Corp. have developed what is believed to be the world's first "pint-size" metals stress and strain testing chamber in which liquid helium is used to attain temperatures as low as minus 452°F.

Results of these tests will provide engineers with needed information regarding types of metals best suited for use under extreme temperature ranges. Information of this sort may well be useful in the design and development of guided missiles and future supersonic aircraft.

May Use Liquid Gas Fuel

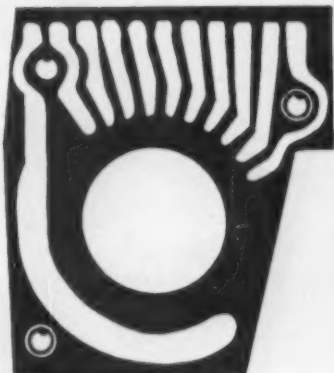
Aircraft of the future may use fuels which are stored as liquefied gases in metal containers at extremely low temperatures. Preliminary studies of the properties of metals at low temperatures will be essential to developments of this kind.

Oxygen for human consumption during high altitude aircraft operation already is being stored in liquid form in metal containers at temperatures of about minus 300°F. This arrangement is more practical than using compressed gas since an equivalent size storage space can contain a much larger supply of oxygen in liquid form.

What's going on in NON-FERROUS METALS

... solder made on automatic machines

is more precisely compounded and free of flaws. Used increasingly for printed circuits (as pictured at right) in the electronics field, for sheet metal work, and for general soldering everywhere in industry. Called CASTOMATIC® solder, it is made on patented machines, by Federated only. Write for 36-page "Solder" brochure.

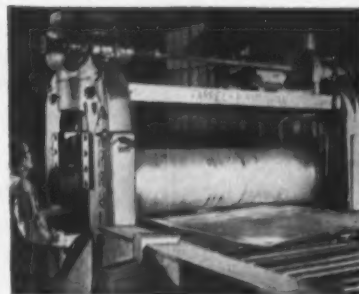


... zinc dust for the chemical industry

is an effective chemical reducing agent; yields salable by-products; costs less than other reducing agents. It is also used in paints which protect against corrosion.

... sheet lead for radiation protection

is used in the new Deep Therapy room of Seattle's Swedish Hospital. Federated supplied metallurgical help and all the lead. Through Federated, American industry has access to the acknowledged center of lead research and technical service. Ask for 48-page "Lead Handbook".

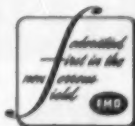


Federated people work constantly with copper, tin, lead, zinc and other non-ferrous metals. The company makes thousands of non-ferrous items. That is why it has earned the name **"Headquarters for Non-ferrous metals."**

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ALUMINUM, MAGNESIUM, BABBITTS, BRASS, BRONZE, ANODES, ZINC DUST,
DIE CASTING METALS, LEAD AND LEAD PRODUCTS, SOLDERS, TYPE METALS



Chamber, slightly larger than a hand fire extinguisher, uses liquid helium.

Although much larger testing apparatus has been used at low temperatures in the past, the Westinghouse-developed chamber, which is only slightly larger than a hand fire extinguisher, is believed to be the first of its kind in the world to use liquid helium in order to attain the minus 452°F mark for purposes of tension testing.

This extremely low temperature is just short of the absolute zero reading of minus 459.6°F, the point at which, theoretically, all molecular motion ceases.

Prior to the use of liquid helium as a refrigerant, tests were conducted at temperatures as low as minus 320°F by using liquid nitrogen.

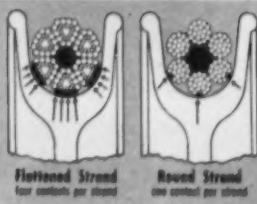
How It Works

Temperatures which heretofore have been virtually unheard of even in the most severe climates now are frequently encountered in national defense, industry, and laboratory research work. New engineering problems have arisen from this work and have led to an intensified research program at Westinghouse.

Aims of such investigations are concerned with obtaining a better understanding of the strength of metals and the factors which cause brittle failures. Normally used steels, for example, become brittle and rubber loses its elasticity when subjected to the low temperatures obtainable with liquefied gases.

Withstands Temperature Extremes

The Westinghouse - developed cold test chamber works like this: A sample of the metal to be tested, about 1 in. long, and 1/4 in. in diam, is placed inside the special vacuum insulated chamber. Gripping it at either end are two special Discaloy rods. Discaloy is an alloy developed several years ago by Westinghouse to withstand high temperatures and high



How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope—and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

Depend on Leschen's higher-than-rated quality for longer-than-expected service.



LESCHEN WIRE ROPE DIVISION

H. K. PORTER COMPANY, INC.

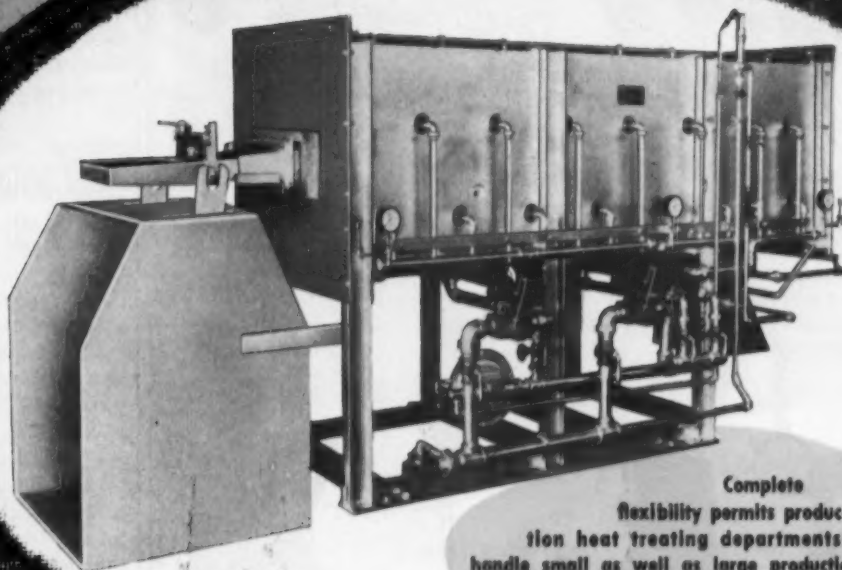
St. Louis 12, Missouri



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Patent 2,671,654

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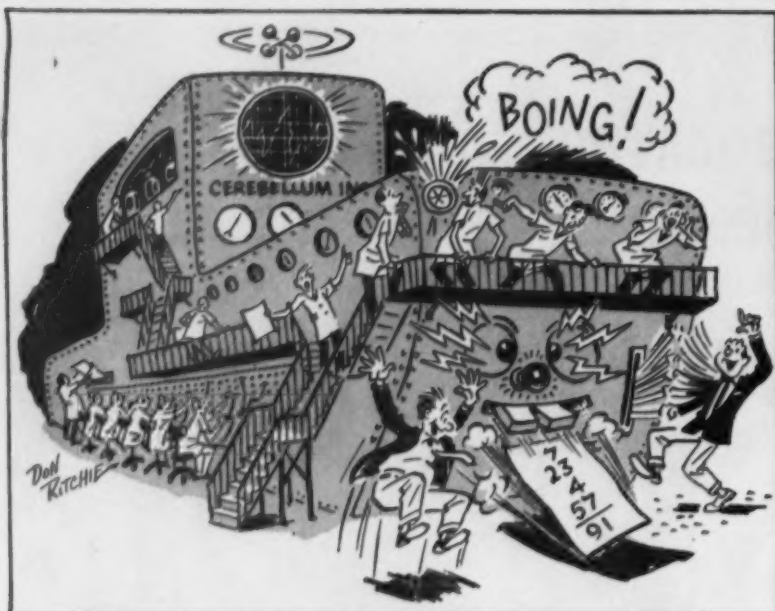
ELIZABETH 4, N. J.

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ADDRESS.....



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Metal samples tested at 452° F below zero . . . Strain readings taken.

stresses for extended periods of time.

It has been recently discovered that Discaloy is also a very good material for low temperature applications. Liquid nitrogen is forced into the chamber first to cool it from room temperature to minus 320°F. At this point the liquid helium takes over and the temperature may then be dropped to minus 452°F.

Nitrogen Helium Used

Nitrogen is used in the room temperature to minus 320°F range because it is considerably more economical and efficient than is the use of helium at these temperatures.

By the use of these two refrigerants, tests can be conducted at any temperature from zero to minus 452°F.

When the inside of the chamber and the test sample have cooled to the desired temperature, the test is started by applying a load to the Discaloy grips in such a fashion as to pull the sample apart. The load is applied until the piece of metal being tested breaks.

Coating:

Combination cork, mastic material give double protection.

A spray coating for metal equipment that combines protection from corrosion with a moderate degree of insulation has been perfected by the Tar Products Div. of Koppers Co., Inc.

Black in color, the new Bitumastic "K" is made of processed coal tar pitch mineral filler, solvent, and granulated cork. Requiring no primer, one application of this coating produces a protective covering up to 1/2 in. in thickness.

For Metal Storage Tanks

This new cork mastic was developed for use in locations where metal tanks containing heated ma-

TECHNICAL BRIEFS

terials require corrosion protection as well as insulation to prevent major heat losses. It may be used where massive insulation, installed at much greater cost, is not required.

Such combined protection is best suited for oil storage tanks, asphalt storage tanks, any metal tank whose contents are kept at temperatures up to 150°F, chemical plants or equipment, corrugated steel sidings, and heating and ventilating ducts.

Wiring:

Raceways with plastic bushings promote electrical safety.

Raceways, a key safety feature of modern electrical wiring, have been made even safer with a new connection idea using built-in insulation. The new type raceway was developed by Thomas & Betts Co., Elizabeth, N. J.

For the first time, built-in plastic bushings are used to prevent wiring from coming in contact with the metal of the raceway at the outlet. The bushings are colored bright blue for easy identification.

Makes Wiring Easier

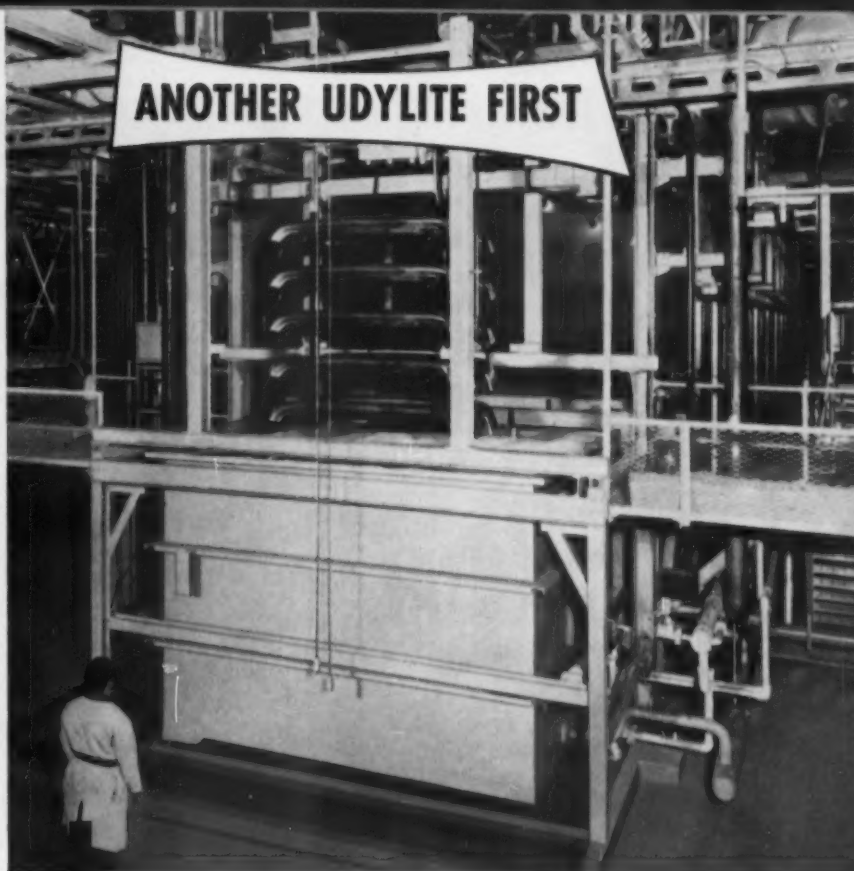
The development follows a fast-growing trend spurred by the National Electric Code, which specifies insulation at raceway outlets for No. 4 conductor or larger.

The new Insuline fittings, UL approved, are designed for rigid, EMT and flexible raceways. They protect wire insulation from damage and reduce up to 50 pct the effort required by an electrician to pull wiring through a raceway,



Use plastic liner . . .

ANOTHER UDYLITE FIRST



480 FEET OF PLATING EFFICIENCY

Udylite Selective Cell Plating Machine Electroplates 360 Automobile Bumpers Per Hour

Today in one of the nation's largest automobile plants, bumpers are being copper, nickel, chrome plated with a quality of finish and efficiency of operation unmatched by any other method. This work is being done on a new automatic electro-plating machine—a product of Udylite research—which incorporates features exclusive in Udylite equipment.

The Udylite design allows for automatic selection of empty plating cells as the racks emerge from preceding operations. As they drop into the cells they fit around anodes in the tank that are hung to conform with the shape of the bumper. This assures quality plate on all curved surfaces. Efficiency in rack utilization is also a feature, for of the 84 racks used for the machine, only four are out of service during the normal plating cycle.

Udylite builds plating and metal finishing machines large and small. The Udylite Full Automatic was the first standardized plating machine ever offered to the industry. It brought economy, high production and process control at a low installation price.

If you have a plating problem it will pay you to consult Udylite. Write to:

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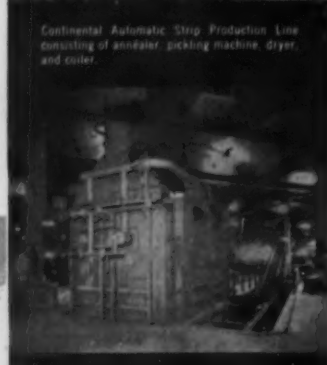
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tests at wiring installations show.

Self-insulated raceway connectors also provide lowest installed cost, because they eliminate the possibility of an electrician forgetting the separate insulating bushing required with ordinary types.

Resists Corrosion

The plastic bushings, assembled integral with the connector bodies, have important electrical features. Surface smoothness provides low friction for wire pulling and prevention of skinning and abrasion of wire insulation. Another feature is high insulation quality of the bushing itself. Also, it resists corrosion and has high impact strength.

Integral assembly of bushing and connector at the factory eliminates the inconvenience of loose parts. Easy inspection of installed connectors is possible, because the brilliant blue plastic sleeve protrudes slightly beyond the fitting body forming a telltale ring that an inspector can see at a distance.

Disposal:

**Graphic central control panel
simplifies disposal problems.**

Faced with a difficult waste disposal problem, Oneida, Ltd., silver plating firm of Oneida, N. Y., installed a new waste treatment and silver recovery plant featuring a graphic control panel.

An innovation in waste treatment instrumentation, the panel was built by The Foxboro Co. of Foxboro, Mass., and provides complete, centralized control of the



Graphic control board...

TECHNICAL BRIEFS

separate stages involved in neutralizing plating contaminants such as cleaning chemicals, plating metals and cyanide solutions for safe discharge into community waterways.

Plastics:

New technique assures improved polyvinylchloride moldings.

A new technique for molding such refractory plastics as pure polyvinylchloride has been developed by Stokes Molded Products Div. of The Electric Storage Battery Co. The new technique permits economical processing of pure nonplasticized polyvinylchloride (rigid PVC) in intricate and complex moldings, not only for large production runs but also for small lots.

Rigid PVC is well known for its resistance to corrosive fumes and liquids, as well as industrial chemicals, reagents and wastes. Field PVC installations of fabricated sheet stock have been in continuous use in many European chemical plants for more than 17 years.

Mold To Close Tolerances

Molding compounds of rigid PVC formerly were adulterated with fillers and plasticizers to facilitate processing. This prior technique greatly reduced the plastic's natural chemical resistance and mechanical strength.

The new process solves both problems and permits molding to close tolerances with no more than minor finishing operations. Even fully molded screw and bolt thread now are practicable, according to Stokes officials.

Used In 25 Industries

In spite of certain undesirable features, earlier forms of rigid PVC have found use in more than 25 basic industries. Unplasticized PVC as processed by Stokes is expected to have uses in many industrial products.

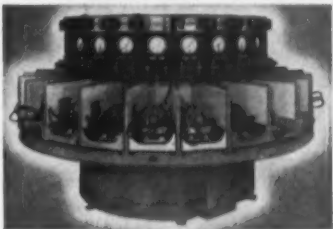
More than 375 million lb of vinyl chloride were used in 1954, of which less than 10 pct was rigid PVC.

HOW TO GUARANTEE

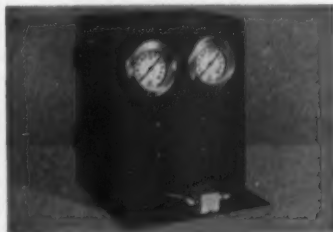
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24-station compressor test stand makes 4 tests per unit at 300 units per hour.



Flow test device for refrigerator capillary tubing.

What would it take to give your product another competitive edge?

Ability to offer a 100% performance guarantee? Higher efficiency ratings? A reputation for eliminating parts failures? A watertight story on operating quality?

Before you call such goals "impractical", it will pay you to find out how Acme-built test equipment is insuring satisfactory product performance for leading industries and government departments.

Whether your goal involves 100% inspection at production-line speeds, or spot-checking of manufactured or purchased components—Acme will analyze the problem, recommend solutions, and estimate the cost of equipment and operating time.

If you have blueprints, send them. If not, state your problem and Acme's creative engineering staff will take it from there. No obligation, of course.

Acme

Acme Aluminum Alloys, Inc., Dayton, Ohio

TEST EQUIPMENT

Process Equipment . . . Special Machinery
Tools . . . Dies . . . Jigs . . . Fixtures

Carbides:

Find new use in testing at elevated temperatures.

Recent-on-the-job tests of grade 608 chrome carbide, developed three years ago by Carboly Dept. of General Electric Co., Detroit, indicate the structural material answer for testing devices used in testing high-temperature metals.

The chrome carbide, Carboly engineers report, is proving to be an excellent structural material for load applying members and sample grips employed in high-temperature transverse rupture and tensile stress rupture testing for anvil and Brale extensions in high-temperature hardness testing, and as Brinell balls in elevated temperatures hardness evaluations.

Material strength good to 1500°F . . . Resists creep, deformation to 1800° F.

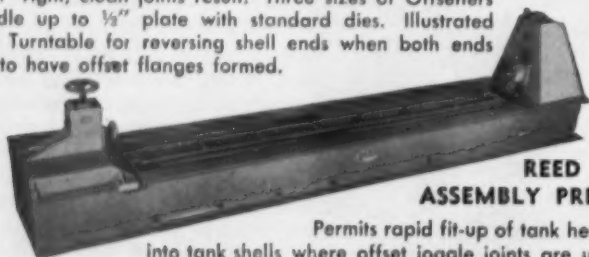
Among the bottlenecks in evaluating high-temperature materials, Carboly engineers say, is the unavailability of adequate material for constructing testing devices to withstand very high temperatures required for such evaluation.

WEBB TANK PRODUCTION MACHINERY

REED OFFSETTER



This machine forms an offset flange around shell ends to facilitate automatic welding of tank heads. It eliminates chill rings, decreases fit-up time, improves the concentricity of shell ends, and aids in reducing actual welding time. Tight, clean joints result. Three sizes of Offsetters handle up to 1/2" plate with standard dies. Illustrated with Turntable for reversing shell ends when both ends are to have offset flanges formed.



REED ASSEMBLY PRESS

Permits rapid fit-up of tank heads into tank shells where offset joggle joints are used. Hydraulic pressure is applied through ball-and-socket swivel joints that allow the head cups to set to the head. Hydraulically powered kick-outs speed up loading and unloading. Both headstock and tailstock are adjustable vertically; tailstock is also adjustable along the bed for various lengths of vessels up to 18'.

Fit-up rolls are also available to facilitate proper alignment and assembly of shells lacking rigidity.



FOR ILLUSTRATED LITERATURE WRITE DEPT. E

REED
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THE **WEBB** CORP.

WEBB CITY, MO.
U. S. A.

Strength At High Temperature

They point out that an ideal material for such tests must have strength at elevated temperatures, resistance to oxidation, stability to structural changes and high creep resistance.

Most materials rapidly decrease in strength when temperatures go over 1500°F, have low creep resistance at these higher temperatures, and as temperatures increase over 1500°F, rapidly decrease in oxidation resistance. Ceramic materials are generally very brittle and are therefore poor in supporting bending loads.

Resists Creep, Deformation

Tests with chrome carbide 608 as a structural material indicate it has good strength at temperatures as high as 1500°F, resists creep and deformation at temperatures of 1800°F or higher, and is very resistant to oxidation at 1800°F.

The hardness of chrome carbide 608 is RA 89 at room temperature, and RA 76 at 1500°F. Its transverse rupture strength is 100,000 psi at room temperature, 120,000 psi at 1500°F, and 100,000 psi at 1800°F.

Good Oxidation Resistance

The material's gain in weight at 1800°F in 24 hours in static air is 7 mgs per square inch. It's coefficient of thermal expansion is closer to steel than other cemented carbides— 4.9×10^{-6} in/in°F over the range of 68 to 248°F.

The combination of high temperature strength and oxidation resistance found in grade 608 makes the material increasingly useful in the high temperature testing field.

New Books:

"Quality Control and Research—Insure Your Product in Tomorrow's Market," public information committee, Scientific Apparatus Makers Assn. Points out advantages of the addition of a chemist and a quality control and research laboratory to small business operations. Scientific Apparatus Makers Assn., 20 North Wacker Dr., Chicago 5. 25¢ if requested on company letterhead. 24 p.

"A Treatise on Ores and Assaying." First published in 1574, this newly translated work was the standard treatise on assaying for more than 150 years. Woodcuts from the 1586 edition show machines and methods used in that period. Dover Publications, Inc., 920 Broadway, New York 10. \$3.95. 393 p.

"Minerals Yearbook, Fuels, 1952," Bureau of Mines, Fuels and Explosives Div., U. S. Dept. of the Interior. Report on mineral fuels in the United States. Covers each mineral-fuel commodity, reviews the industry as a whole, and contains a statistical summary and an employment and injury presentation. U. S. Government Printing Office, Washington 25, D. C. 450 p. \$2.25.

"Capital and Output Trends in the Mining Industries, 1870-1948," by Israel Borenstein. A study of trends since 1870 in the ratio of capital to output in the mining industries of the U. S. 81 p. \$1.00.

"How to Use and Maintain Gear Cutting Tools," Metal Cutting Tool Institute. Discusses the effective selection, use and maintenance of cutting tools. Covers such factors as proper mounting, proper feeds and speeds, coolants, sharpening, inspection and storage. Gear Generating Tools, Sub-Div. of Metal Cutting Tool Institute, 405 Lexington Ave., New York 17. \$1.00 31 p.

"The 'Tru-Cast' Handbook," fourth edition. Guide to the use of beryllium copper pressure-cast cavities and cores in applications including injection molding, compression molding, zinc diecasting, and stamping dies. Manco Products, Inc., 2401 Schaefer Rd., Melvindale, Mich. 48 p. \$2.00, free if requested on letterhead of firm

engaged in stamping, molding or related activity.

"Welding for Engineers," by H. Udin, E. R. Funk and J. Wulff. Presents the principles on which the art and science of welding is based. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 430 p. \$7.50.

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SPECIFICATIONS

Capacity — 75 tons. Standard Stroke — 4". Maximum Stroke (to order) — 8". Strokes per minute — 42 (non-geared type 85). Throat Depth center of ram to frame — 13½". Die Space* — 14" to 22". Bolster Plate Area — 36" x 26".

* bed to ram, standard stroke down, adj. up.



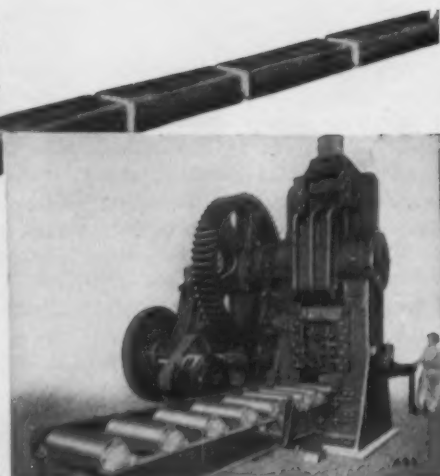
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TECHNICAL BRIEFS

Ferroalloys:

**Plant expansion boosts
firm's capacity.**

Facilities for full-scale production of special alloys, processed minerals and ferro-alloy powders, have been completed at Newfield, N. J. by Shieldalloy Corp. of New York.

Materials now in production at the Newfield plant include high quality chromium and other metals used in the manufacture of special alloys, particularly for jet engine applications.

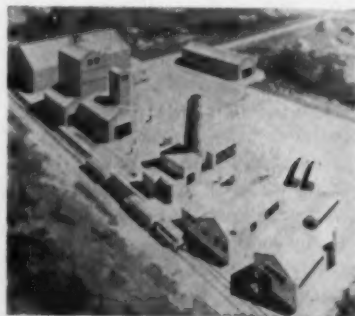
Integrated Production

Tungsten melting base alloy, widely used in tool steel manufacture, is produced at Newfield. Titanium-aluminum, zirconium-aluminum, and ferro-columbium can be produced at the new plant.

The new plant is engineered to integrate modern production techniques with custom-designed processing equipment. At the Newfield plant, mineral processing involves drying, grinding, classifying and bagging. Before a material is milled, it is dried and then automatically conveyed into the processing plant, which can handle more than 20,000 tons of material annually.

Tailored to Needs

Extensive air and physical particle separation and classifying equipment provides finished materials tailored to specific industrial requirements. Bagging of the material is done automatically.



New plant layout . . .



FLEXIBLE METAL HOSE with "Built-in-Finish" fabricated from Brainard electro-galvanized steel. Brainard coating enhances appearance of product . . . requires no finishing operation.

Brainard electro-galvanized steel eliminates plating and finishing costs

● Products fabricated from Brainard electro-galvanized steel have lasting protection against rust and corrosion . . . yet require no expensive plating or finishing operations. Galvanized coating, an integral part of the steel, is not affected by forming. Brainard galvanized steel can be fabricated by

all standard methods.

Various thickness coatings can be supplied, and coating can be controlled within .0002 of an inch.

Let Brainard quote on your requirements. For free booklet and sample, write Brainard Steel Division, Dept. O-2, Griswold Street, Warren, Ohio.

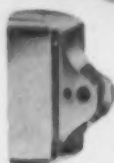


**COMPLETE STRAPPING SYSTEMS & MATERIALS •
WELDED STEEL TUBING • ELECTRO-GALVANIZED STEEL •
SCAFFOLDING • PALLET RACKS • BUILDING PRODUCTS**

Offices in principal cities throughout the U. S.

Foundries and their customers agree...

SHELL MOLDING with G-E SHELL RESINS CUTS COSTS



BRONZE DOOR CASE—
"Machining and
polishing cut 50%"



YOKES—
"Production time
cut 56%—
finishing costs 50%"



**NICKEL-BRONZE
DRAIN HEADS—**
"Costly thread-cutting
eliminated"



PUMP BODIES—
"Machining reduced or
entirely eliminated"

Why are so many foundries turning to shell molding? Why are so many of their customers specifying shell-cast parts? The answer is simple: *Shell molding cuts costs.* Smoother surface finish, greater dimensional accuracy, and greater yield per man-hour are among its advantages over conventional sand-casting methods. (Note the brief testimonials—from G-E files—that tell the story!)

Ask G. E. about shell molding

General Electric offers a number of foundry products to help you get maximum benefits from shell molding: *G-E phenolic shell-molding resins* to form light, dimensionally accurate molds... *G-E silicone parting agents* to secure quick, easy release of molds from patterns... *G-E phenolic bonding resin* to cement shell halves together.

FREE BOOKLET AVAILABLE



How can shell molding help YOU?

General Electric, a major supplier of resins and release agents for the shell-molding process, has prepared an informative 28-page booklet telling about the techniques and benefits of this new foundry method. For a free copy of *G-E Shell Molding Manual*, just write to General Electric Company, Section 522-3, Chemical Materials Department, Chemical and Metallurgical Division, Pittsfield, Massachusetts.

Progress Is Our Most Important Product

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CLARK BROS.
QUALITY INDUSTRIAL FASTENERS SINCE 1854
BOLTS NUTS RIVETS SCREWS

For further information, write—150 Canal Street

CLARK BROS. BOLT CO.

MILDALE,
CONN.

SAVE MAN HOURS in metal cleaning! STOP COSTLY HANDLING and moving with the MANPRO B-121 VAPOR DEGREASER



ONE COMPLETE UNIT FOR ALL SMALL PARTS CLEANING!
ABSOLUTELY ELIMINATES FIRE HAZARDS!
SECONDS CLEANING CYCLE!
CAPACITY—500 LBS. OF STEEL PER HOUR!
QUICKLY INSTALLED—HAS STANDARD POWER AND WATER CONNECTIONS!

Clean your parts or assemblies right at the operation with the MANPRO B-121. You can move it wherever required... install it in 15 minutes. You can protect your production against costly rejects. Let the MANPRO B-121 catch the defects by cleaning after machining... before inspection... before plating, painting, or bending... after buffing. This low cost vapor degreaser will pay for itself quickly in man-hour savings alone!

FREE TRIAL OFFER! Prove the dividend-paying economy of MANPRO degreasing in your own plant with your own workman. No obligation. Write today.



MANUFACTURERS PROCESSING CO.
MANPRO METAL CLEANING EQUIPMENT AND CHEMICALS

1358 Milton Road — Detroit 20, Michigan
Branches: Cleveland, Ohio, and Grand Rapids, Mich.
Representatives in Principal Industrial Centers

NEW EQUIPMENT

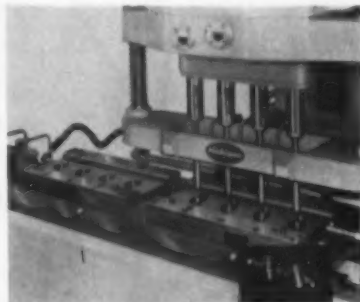
New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 113 or 114

Fixture eliminates need for further super finishing

A two-station automatic shuttle fixture that is mounted on a Michigan Standard Hydro 5 finish reams 1200 rocker arms per hr. No further super finishing of the rocker arm shaft hole is necessary as the machine gives a finish of between 20 and 30 microinches. One station is loaded while processing takes place at the other station.

It's built to JIC standards. Coolant is supplied to each spindle, and all parts are lubricated automatically. Interchangeable nesting plates, for any size or shape rocker arm will fit this fixture. After the finish reaming, the rocker arms are ejected automatically. *Michigan Drill Head Co.*

For more data circle No. 29 on postcard, p. 113.



Portable band saw easily moved by one man

For users requiring mobility of equipment, a new portable band saw of all-steel construction is mounted on large size rubber tired wheels and can be moved easily by one man. Comparatively lightweight, it can be wheeled to any spot where it is more practical to roll the saw to the stock, than bring

the stock to the saw. It is capable of handling on the job 5-in. rounds and 10-in. flats. Eliminates hand cutting of structural steel, pipes, etc. Saves time, cuts labor costs, prevents slow-ups. Locks are provided for machine during transit. *Johnson Mfg. Corp.*

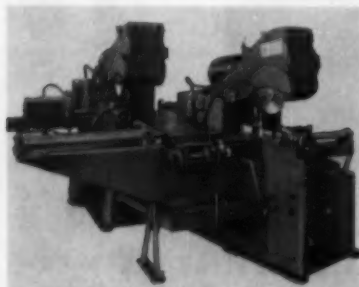
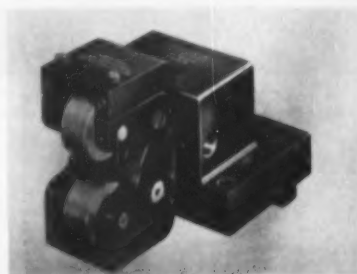
For more data circle No. 30 on postcard, p. 113.

Rolls high precision, close tolerance threads

Only one adjustment for precision matching of rolls and two adjustments to precisely set pitch diameter are required on a new thread rolling attachment. Designated the Precision-Rol, it rolls high precision, close tolerance uniform threads, right or left hand, on automatic screw machines or

turret lathes at mass production rates. Annular or helical grooves, taper threads and non-uniform starts can be produced—also knurling and burnishing. Five standard sizes are available. All gearing on the Precision-Rol is totally enclosed. *Sheffield Corp.*

For more data circle No. 31 on postcard, p. 113.



Standard machines combined to do special job

Two Model 00G automatic circular sawing machines are combined to cut from stock a piece of 2½ in. long, with a right-angle cut on one end and a 15° angular cut on the opposite end. The machine in the rear cuts a piece twice the finished length to provide the square ends. In cutting the piece in half, the desired end result is a part with a

15° angle at one end and a 90° angle at the opposite end. Stock is fed automatically to the machine. At 100 pct efficiency 89 cuts per hr are possible, in this case, on c-1118 hot rolled steel, 1½ x 2½ in. *Motch & Merryweather Machinery Co.*

For more data circle No. 32 on postcard, p. 113.

Turn Page



STOP

CRANES SAFELY

with **EC&M**

DYNAMIC BRAKING BRIDGE-STOP CONTROL

POSITIVE STOPPING by the same motors that drive the crane . . . even when power fails or overload relays trip.

Now . . . collision between cranes, crashing into the end-bumpers, and wheel-sliding stops can be avoided by the use of simple equipment. Crane motors are automatically converted into self-excited generators by this EC&M Bridge-Stop Control to provide quick, positive stopping. Transition to dynamic braking occurs instantly on power failure or when overload relays trip. Braking is not dependent on an outside source of power.

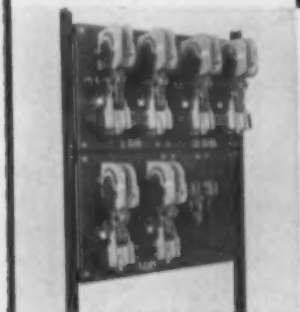
This EC&M system of control is fast and equally effective when traveling in either direction. Graduated braking is maintained throughout the entire stopping period by a pulsating spring-closed contactor . . . an exclusive EC&M feature. On icy, slippery rails, wheels do not slide to a stop . . . instead, this system automatically releases and then re-applies retardation to give a quicker stop than when the wheels remain locked.

EC&M Dynamic Braking Bridge-Stop Control is easily applied to new and old cranes to provide power-failure emergency operation. It is also designed for service-braking operation which is selectively applied by the operator or end-zone limit switches.



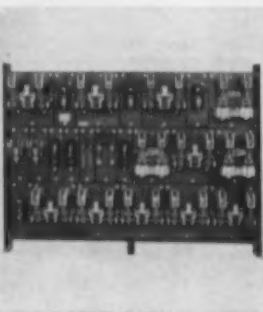
Eliminate hazards due to slippery rails . . . inability of operator to reach foot-brake in time when power fails.

Obtain smoother, safer operation when you change over to EC&M Dynamic Braking Bridge-Stop Control.



For existing installations, this panel provides graduated dynamic braking for quick, sure stops.

6149



Complete Duplex (2-motor) Controller including EC&M Dynamic Braking Bridge-Stop Control.

Write for Bulletin 921-6.0



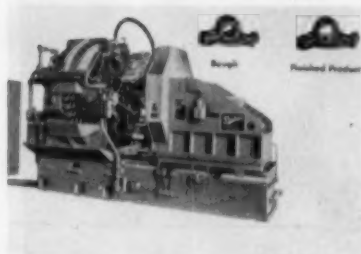
THE ELECTRIC CONTROLLER & MFG. CO.
2698 East 79th Street • Cleveland 4, Ohio

Flexible shaft machine features hook mounting

Where floor space is at a premium a hook or trolley-mounted flexible shaft machine is desirable. The multi-speed machine illustrated is being used to grind down the seams on the inside of stainless steel milk tanks. The hook makes it easy to lower the machine through the small hole in the top

of the tank. It has a $\frac{1}{2}$ hp motor and is employing a RM 40 angle-head running at 4450 rpm and a sanding drum. The V-40 machine can be operated at speeds of 1725, 2700, 4450, and 6900 rpm and is furnished with 6 ft shaft. *Stow Mfg. Co.*

For more data circle No. 33 on postcard, p. 113.



Processes 720 valve rocker arms per hour

This 2-way 6-station trunnion-type hydraulic-feed Special processes 720 valve rocker arms per hr at 80 pct efficiency. A hydraulically operated checking station follows the drilling of 0.070 in. diam holes, stopping the machine automatically if the hole is not drilled com-

pletely through. A standard 6-position cam-and-roller type automatic index table is complete with shot bolt. The 20-spindle right-hand head has a master gear box which incorporates 5 individual clusterheads. *Buhr Machine Tool Co.*

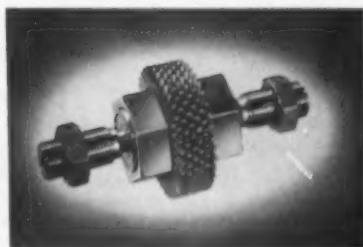
For more data circle No. 34 on postcard, p. 113.

Low cost dresser cutter sharpens abrasive disks

The Besly Wise Type dresser cutter has slim fingers which pick abrasive grain from the surface of grinding disks, instead of crushing the grain and rolling it off. This cutting action sharpens the disk without changing its grinding characteristics. The pick-out teeth

require less pressure on the disk for efficient sharpening and last longer because friction is reduced. A square arbor holds the teeth in staggered position and prevents chewing the arbor spindle. *Besly-Welles Corp.*

For more data circle No. 35 on postcard, p. 113.



Order filling costs cut; services speeded

By installing standard adjustable steel shelving units order filling costs have been cut and customer services speeded by a distributor of nuts, bolts and screws. Design of shelves permits order pickers to see contents from any angle. Quick accessibility to stock is afforded and inventory taking is simplified. Better housekeeping is encouraged. Shelves are fireproof,

and they can be adjusted for any future use. Shelves have solid backs and sides, or can be covered with wire mesh. Posts, shelves, sway braces and other parts are cut on accurate dies that assure smooth edges and ease of assembly. A range of 430 combinations is available in Hallowell adjustable shelving. *Standard Pressed Steel Co.*

For more data circle No. 36 on postcard, p. 113.

Hydraulic truck facilitates handling reels of cable

Reels of cable weighing 10,000 lb with a maximum reel diameter of 90 in., minimum, 36 in., and a width of 44 in. can be handled on this cable reel truck. Inside width of the truck is 46 in.; overall width 59½ in. Adjustable lifting hooks hold the shaft of the reel. A simple pump motion on the handle from any point in a 180° arc

raises the reels 6 in. from the floor. The reel is automatically held at any point until lowered. A rear wheel hand brake holds the truck in position and allows the cable to be played off while the reel is on the truck. *Lewis-Shepard Products, Inc.*

For more data circle No. 37 on postcard, p. 113.

Turn Page



"Janitrol heaters are the most satisfactory for us. Maintenance is no problem at all"

O. W. WHEELER,
Maintenance Supervisor,
Garland-Temco Plant.

GARLAND, TEXAS BRANCH PLANT



Starting in 1946 with 100 Janitrol installations, Temco Aircraft Corporation added 43 more in 1951-52 . . . 6 in 1953 to keep pace with the Garland Branch plant expansion program. Their repeat installations over an eight year period clearly indicate complete satisfaction with Janitrol quality, dependability and low operating costs.

Whether your heating needs can be met with one unit heater or 100, it's important to you that an experienced, local Janitrol contractor size and install the right equipment.

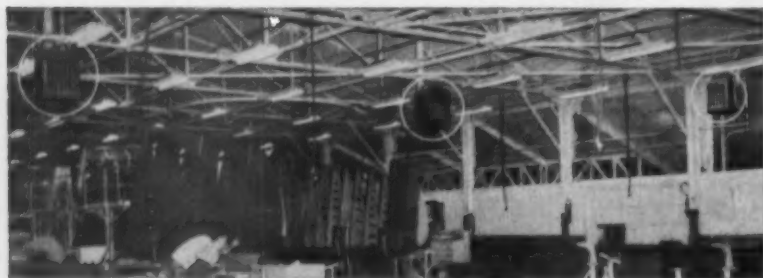
This way, you get triple assurance of efficient and economical heating. You get equipment with unequalled performance record . . . equipment that's properly installed . . . and backed by a responsible engineering and service organization.

Local Janitrol gas heating engineer-installers are listed under "Unit Heaters", yellow pages, your phone book.



Mr. Wheeler checks in shipment of Janitrol gas-fired units, installed as part of Temco-Garland's 1953 expansion program.

* With over a million steel heat exchanger tubes installed since 1940, less than 1/4 of 1% have been replaced for any cause.



149 JANITROL INSTALLATIONS SINCE 1946 PROVIDE EXCELLENT WORKING CONDITIONS AT LOW OPERATING COST



Write today for information on unit heaters for new or remodeled buildings of all types. Ask for "Businessmen's Blue Book of Better Heating".

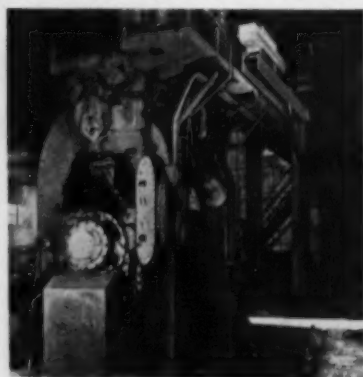
Janitrol Heating
& Air Conditioning Division
Surface Combustion Corporation
Columbus 16, Ohio
In Canada: Alvar Simpson Ltd.
Toronto 13

ALSO MAKERS OF *Surface* INDUSTRIAL FURNACES AND *Kathabar* HUMIDITY CONDITIONING

NEW EQUIPMENT

Measures red hot strip

Measuring red hot steel strip accurately as it travels at rates up to 2000 fpm is possible with a new non-contact gage, the Infra-Ray Gage. The gage head may be located from 10 to 20 ft above the molten metal and yet accurately measures widths from 3 in. to 10 ft. Strip temperatures from 900°



to 2000°F do not affect accuracy. Gaging is continuous. Signals are sent to the edger, speed operator, and roller when width of hot strip varies from any pre-determined measurement. This eliminates trouble from pull-down, reduces edge trim waste and order hold-back expense. *Industrial Gauges Corp.*

For more data circle No. 38 on postcard, p. 113.

Mechanical seals

New type BJ mechanical seal for high pressure boiler feed pumps stops liquid loss, reduces heat loss and requires no operating adjustment. The seals are in operation

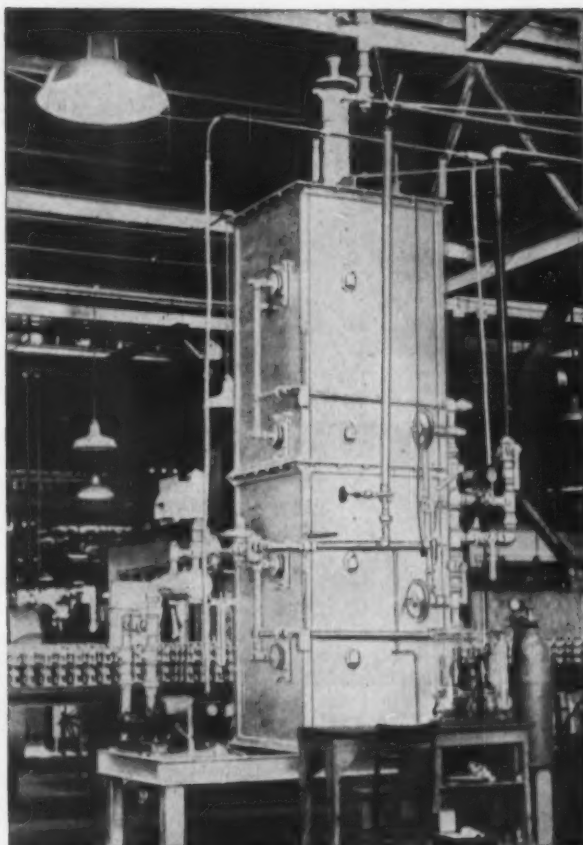


in a number of high pressure hot water pumping operations including temperatures up to 430°F. Maintenance is simplified since no operating adjustment is required. *Byron Jackson Co.*

For more data circle No. 39 on postcard, p. 113.

Turn Page

**going strong
after 13 years**



FIRST RX® GAS GENERATOR STILL PAYING OFF

This "pioneer" at Warner Gear Division, Borg-Warner Corp., Muncie, Ind., shows some of the advantages of 'Surface' endothermic gas generators. This was the first practical catalytic gas generator for continuous bright gas carburizing . . . and it's still in use. It has paid for itself many times since it started operating on April 4, 1941. As a result, Warner Gear has standardized on 'Surface' RX® gas generators for its gas carburizing operation; the world's largest single installation.

Surface Combustion has installed hundreds of RX® gas generators since 1941. They contribute to the making of every car made in the U. S. New developments have improved their accuracy, reliability and output. Users have found lower maintenance costs.

Find out what RX® atmosphere gas generators can do for you. Call for a sales engineer or write for Literature H54-6.



SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

ALSO MAKERS OF

Kathabar

HUMIDITY CONDITIONING

Jantrol

AUTOMATIC SPACE HEATING



New high in abrasive speed tops 18,000 fpm

Through the development of a special method of processing abrasive coated cloth disks, a grinder operates at a perimeter speed of more than 18,000 fpm. The new Neece-2-Twenty is a 20-in. diam double disk machine. It is powered with a special 10 hp motor, fully adequate, it is reported, to handle heaviest material removal loads

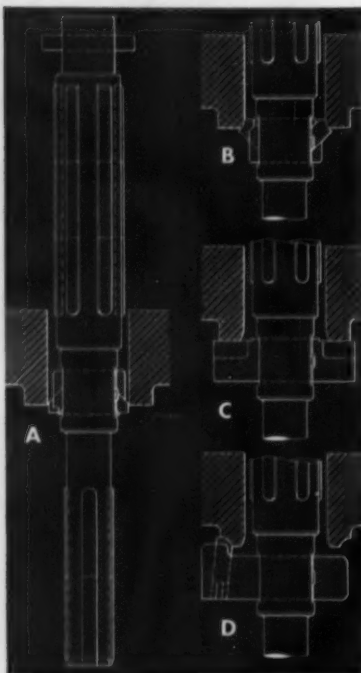
without reducing disk speed. It is direct driven and supplied in 220 or 440 v, 60 cycle. When both rapid material removal and fine finish are required, the use of coarse grit abrasive on one disk and fine grit abrasive on the other disk will accomplish this efficiently. *New Era Engineering Co.*

For more data circle No. 40 on postcard, p. 113.



Unusual Production Job Made Possible by Quick-Change Feature

After forward stroke boring, using standard boring block (A), three other operations were performed alternately on the backward stroke of the spindle. Standard block with specially ground blades (B) and special blocks (C, D) use the same slot in the bar.



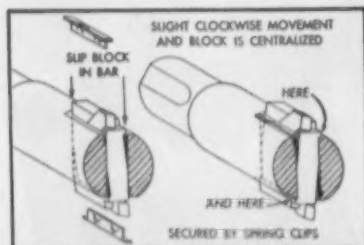
Quick-Change Boring Blocks for Roughing, Semi-Finishing, Reaming

These interchangeable blocks are quick inserting, self-centering, positive locking in the boring bar without locating holes or screws. Just slip the block into the slot of the bar and engage the projecting lugs to the ground flats on the bar. It is then perfectly centered. A pair of spring clips hold the block in place (see below).

The fully adjustable blades are pre-set to size. Standard blocks run $1\frac{1}{4}$ " to $7\frac{3}{4}$ " diameter, larger sizes are made to order. Blades are highspeed steel, cast alloy, or carbide tipped.

Bars, not weakened by locating holes, withstand the strain of heavy cutting. Ends of each slot are ground after hardening to take the cutting thrust of the blocks, provide rigid support.

The features of Gairing Boring Blocks have made many unique applications possible.



For full data on Standard Blocks and Bars, many more examples of production applications, see the Gairing Boring Tool Catalog. Write us, or call your local Gairing representative.

THE GAIRING TOOL COMPANY

Tooling—Standard and Special

21224 Hoover Road, Detroit 33, Mich.



COUNTERBORING — CON. & MILLS — BORING BLOCKS & BARS — FINE TOOTH CUTTING — SPARE DRILLS — SPECIAL TOOLS — BAR END TURNING TOOLS

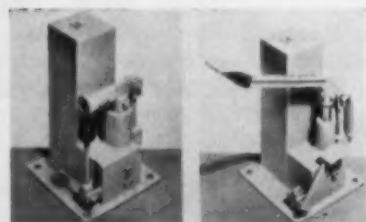
Metal stripper

Successful results with a powder that speeds the action of acids for dissolving defective chromium and nickel from copper base metals without injuring the base metals have been announced. The powder looks like flour and is added to certain acids which increases the rate of dissolving the acids on nickel and chromium. Defective coatings can be dissolved in a matter of seconds or minutes. *Enthone, Inc.*

For more data circle No. 41 on postcard, p. 113.

Two speed pump

New principle of automatic change-over from high speed low pressure to low speed high pressure in hydraulic pump operation is incorporated in the Hi-Lo two-speed concentric piston pump. Made entirely of steel, it is available for hand and foot operation, activated by a single lever or pedal. Hy-



draulic rams are raised speedily until a predetermined internal pressure is reached in the system. At this point, the job is taken over automatically by the specially designed high pressure concentric piston which generates as much as 10,000 psi. The manufacturer offers a made-to-order service for hydraulic cylinders, pumps, and other components to meet specific needs. *Star Jack Co., Inc.*

For more data circle No. 42 on postcard, p. 113.

Tow truck is 100 pct hydraulic-electric

Low-cost operation is claimed for the Tow-Bear, a tow truck that operates on automotive-type batteries. All components are standard automotive and industrial units; service or parts are readily available. Designed expressly for multi-item loads, Tow Bear will answer the need in large and small plants; in hardware and parts

warehouses; in railway freight and baggage yards. No exhaust fumes, no fire hazard and no noise make the truck desirable in confined areas. This 100 pct hydraulic, 3-wheel tow-truck is available in standard and all purpose (8 to 24 hr) models. *Tow-Bear Div., Hudson House, Inc.*

For more data circle No. 43 on postcard, p. 113.



Thread measuring gage

Low cost, precise thread measuring gages for screws and taps give the actual size of the thread and the pitch diameter, without the use of calculations or reference



tables. Determines the strength and interchangeability of the thread. Indicates whether it is within standard limits. Screw or tap is inserted in expanded coil, measurement is taken over coils with micrometer and the reading is checked with limits on the gage data plate. *Metronic Institute.*

For more data circle No. 44 on postcard, p. 113.

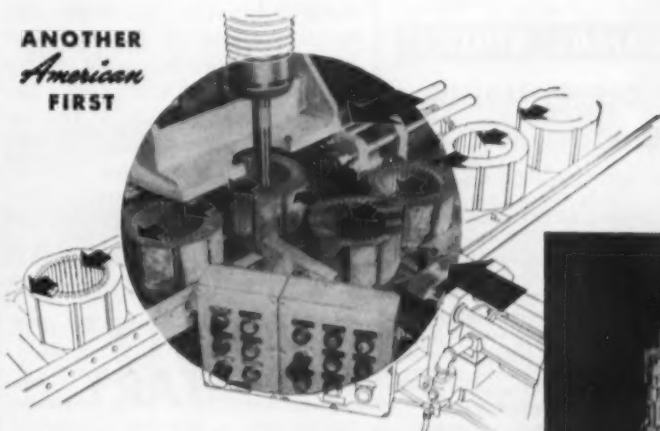
Cleans both sides

Rotoblast machine, Model ES-492, cleans both sides of steel sheet and plate simultaneously, in widths up to 60 in., at a cleaning rate of 60 to 100 sq ft per side per minute. This machine takes the sheet or plate into the blast chamber automatically, blasts the top and bottom surface simultaneously at a single point, removes all abrasive from the sheet, and discharges it from the machine. The blast streams from top and bottom hit the sheet at exactly the same point so there is little tendency for the sheet to warp. The abrasive is blown off and reclaimed. *Pangborn Corp.*

For more data circle No. 45 on postcard, p. 113.

Turn Page

ANOTHER *American* FIRST



... COMPLETELY AUTOMATED BROACHING

STATOR PARTS BROACHED IN 20 SECONDS



Installed in a conveyor line, this American 3-way broaching machine with a hydraulic broach retriever and electrical controls, broaches the I.D. of stator parts in a 20 second cycle. Parts coming into the machine are automatically shuttled into position, broached, and then discharged back on the conveyor line. Interchangeable broach arbors and broach shells make it possible to broach several different parts of similar size.

BEVEL GEAR BLANKS BROACHED IN 15 SECONDS



Using tooling similar to that illustrated, an American (PD) pull-down machine, installed in a conveyor line, automatically broaches the I.D. of a bevel gear blank in 15 seconds. By using interchangeable broach arbors and broach shells, over 20 similar bevel gear blanks are broached with this set-up.



FOR AUTOMATED OR INDIVIDUAL BROACHING PROBLEMS

— SEE *American*

American approaches each broaching problem as part of the complete production cycle. Broaches, fixtures and machines — all designed and built by American — provide a complete broaching service. Let American help you cut your production costs. Send part print or sample to get the solution to your broaching problem. Ask for Catalog No. 450.



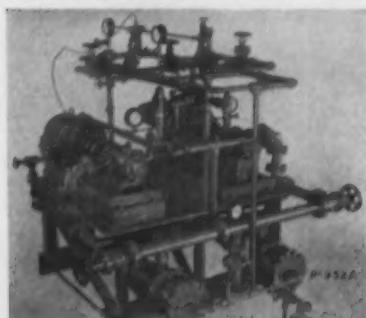
American BROACH & MACHINE CO.
A DIVISION OF SUNSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



**COMPLETE RANGE OF SIZES AND
MODELS IN BOTH MEDIUM AND
HIGH PRESSURE TYPES**

MORE COMPACT than ever



P-952A—Steam Turbine and Electric Motor drive gives flexibility in this compact Model P-952H size No. 25 unit.

NATIONAL AIROIL

**FUEL OIL PUMPING
AND HEATING UNITS**

NATIONAL AIROIL Fuel Oil Pumping and Heating Units are specially designed to prepare, for combustion, all grades of fuel oil including No. 6 or Bunker "C" Oil and residuums. They will draw fuel oil from above ground or underground tanks, preheat it to proper constant temperature and deliver it to Oil Burners at an even pressure, best suited for the burners. Our Fuel Oil Pumping and Heating Units are the result of years of experience. They come completely equipped ready for steam, exhaust, condensate, oil suction, oil return, and electrical connections. All valves, regulators, etc., are readily accessible. The piping arrangement is easily understood. These compact, space-saving units are available in a range of sizes and models in both Medium and High Pressure types. For complete details, write for our Bulletin 40—very interesting and informative.

OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes
STEAM ATOMIZING OIL BURNERS
SLUDGE BURNERS, Steam Atomizing
MOTOR-DRIVEN ROTARY OIL BURNERS
MECHANICAL PRESSURE ATOMIZING OIL BURNERS
DUAL STAGE, Combining Steam and Mechanical Atomization
LOW AIR PRESSURE OIL BURNERS
AUTOMATIC OIL BURNERS, for small process furnaces and heating plants
GAS BURNERS
COMBINATION GAS & OIL BURNERS
FUEL OIL PUMPING and HEATING UNITS
FURNACE RELIEF DOORS
OBSERVATION PORTS
SPECIAL REFRACTORY SHAPES



**NATIONAL AIROIL
BURNER CO., INC.**

1271 East Sedgley Avenue, Philadelphia 34, Pa.
Southwestern Division:
2512 South Boulevard, Houston 6, Texas

Drill unit

A wide range of uses is predicted for an automatic, self-contained drill unit designed for application to special purpose equipment. Actu-



ally there are two new Air-Oil-Matic drill units. One is powered by oil, the other by air, and most parts are interchangeable. Both are hydraulically controlled. Designed for a wide range of drilling, tapping, reaming, chamfering, etc., the units can be mounted vertically, angularly or horizontally. Feed in both directions can be attained by turning a set screw. Feed rate,

feed stroke and quick approach rate are adjustable. *Morris Machine Tool Co.*

For more data circle No. 46 on postcard, p. 115.

Quick release fastener

Assemblers of electronic equipment and other paneled cabinets are offered a fast, low-cost means of attaching and removing panels, plates, and drawers with the new retractable screw fastener. A



quick-release standard fastener, the floating screw permits ample play to end misalignment. Requiring no special tools, assembly is fast

From

START

to

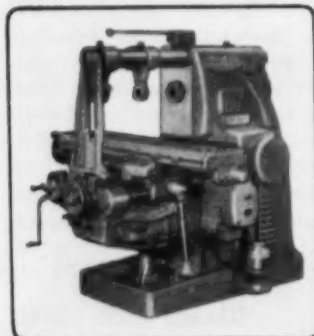
FINISH

Specify

RUTHMAN

GUSHER

coolant pumps



Illustrated is a Kearny & Trecker #2 Model CK Milling Machine equipped with a Gusher Coolant Pump.

From the moment you start your Ruthman Gusher Coolant Pump you get copious coolant flow. There is no priming necessary, and your Gusher Pump uses less power when throttled. Pre-lubricated ball-bearings and an electronically balanced rotating shaft assure you of low maintenance cost and trouble-free operation. Specify Gusher Pumps on your metal-working machinery.

THE RUTHMAN MACHINERY CO.

1809-1823 READING ROAD CINCINNATI 2, OHIO

NEW EQUIPMENT

and simple. The only components are stand-off, screw and vinyl plastic O ring. Brass screw and stand-off are nickel plated. *Southeo Div.*
For more data circle No. 47 on postcard, p. 113.

Rectifier welder

New 300-amp dc selenium rectifier type arc welder has remote control. A 5-range control switch provides coarse adjustment with generous overlap between ranges to provide dual control. The rheostat, which can be removed for remote control, provides continuous control by adjusting the direct current through the control coils. Welding current range is 35 to 425 amp for use with a variety of electrode sizes for repair, maintenance and production welding. Quiet operation is as-



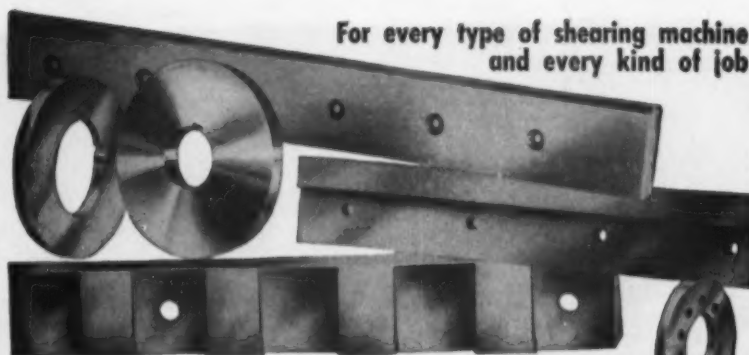
sured by a firmly welded core of electrical steel and the absence of moving iron core or adjustable air gaps. *Hobart Brothers Co.*

For more data circle No. 48 on postcard, p. 113.

Precision angle gage

The Gemo Bevelgauge is used for making and checking angular setups to ± 1 minute of arc, in tool-rooms and inspection departments, on machine setups, or wherever high-precision angle-measuring is required. It is simple and versatile and can be quickly and positively set at any desired angle from 0° to 180° by means of gage blocks. A base, a slide that moves along the base, and an angle bar comprise the gage. All parts are hardened, most surfaces ground, and all measuring surfaces are lapped. *Cleveland Instrument Co.*

For more data circle No. 49 on postcard, p. 113.



For every type of shearing machine and every kind of job

"multicut"

SHEAR BLADES and ROTARY KNIVES

REngineered to the job . . . Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

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THE WAPAKONETA MACHINE CO.
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Knives Engineered for the Job Since 1891

PUNCHES • DIES

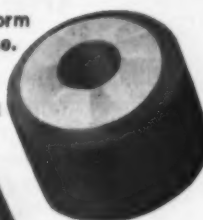
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Made of highest standards and uniform quality thus insuring maximum service.

Since 1903

Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.



Write Dept. 8 for New Catalog 54

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Aimed right at your alloy needs the world's largest alloy steel stocks

Thousands of tons of certified alloy steel in 1698 different sizes, shapes, analyses and conditions await your call at Ryerson. New leaded alloys are on hand in three different carbon ranges. Standard analysis steels are supplemented by a wide range of aircraft quality alloys. No matter what your alloy requirement, you can depend on Ryerson for quick delivery of highest quality steel.

You won't need to check or test your dependable Ryerson alloys before you use them because every bar has been spark tested and identified with its own heat symbol—every heat has been hardenability tested for you as part of an 8-step quality control plan. And should problems of application or fabrication arise, Ryerson al-

loy metallurgists will gladly put years of practical experience to work for you.

No order is too large to fill from stock, no order too small for quick personal service—so, next time you need alloy steel call your nearby Ryerson plant.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished.

ALLOYS—Hot rolled, cold finished, heat treated.

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

TUBING—Seamless & welded, mechanical & boiler tubes.

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate.

SHEETS—Hot & cold rolled, many types & coatings.

MACHINERY & TOOLS—For metal fabrication.



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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY...

Steel users find it difficult to build stocks . . . Producers getting set for bulge in demand in March . . . Scrap is up.

Hard Inventory Look . . . Steel consumers are taking a hard look at their inventories. They don't like what they see. Demand for their own products has improved to the extent that their steel inventories are relatively too small in most cases.

What looked comfortable in the way of steel stocks last November or December no longer produces that "safe" feeling among a big section of steel users. Because of this more realistic look at steel stocks many consumers are trying to build up inventories as a hedge against better business, wage and price increases and a sudden bad turn in international events.

Difficult Job . . . But steel customers are running into some difficulty in building up their supplies. Here is why:

(1) A low state of inventories has been the general rule among steel users. Now, many have suddenly decided to build up stocks. This has extended deliveries on many items and has made it virtually impossible to make any substantial additions to stocks.

(2) Demand for autos, appliances, farm implements and manufactured products has improved to such an extent that most steel deliveries are meeting actual current needs only.

(3) The extension in deliveries of cold rolled sheets and other flat rolled products has meant that deliveries of other items have automatically become a little harder to get. This factor is pushing the steel ingot rate towards 90 pct or more. It also builds backlogs because most steel firms are reluctant to rush high cost steelmaking equipment into production.

(4) Steelmakers must have space for longtime customers who will be in for more steel soon because of seasonal requirements. This situation will be aggravated because of heavy foreign demand for sheets and semifinished steel.

March Demand . . . Smart steelmakers are bracing themselves for a March demand which they feel will make a new record since the highs of 1953. Some steel producers are still trying to read into the picture a letdown in the second half of this year. They are taking that attitude while some of their best customers are trying to get on the books for the third quarter.

The scrap market is on the march. This week heavy melting steel is up \$2 a ton at Pittsburgh and 50¢ a ton at Philadelphia. These changes offset a decline in Chicago to raise THE IRON AGE Heavy Melting Steel Scrap Composite Price 50¢ a ton to \$36.33 a gross ton.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week†	Last Week	Month Ago	Year Ago
Ingot Index (1947-49=100)	132.5	130.4	125.0	110.7
Operating Rates				
Chicago	91.0	90.0	85.0	82.5
Pittsburgh	84.0	83.0	80.0	89.0
Philadelphia	87.0	85.0*	75.0	76.0
Valley	88.0	87.0	83.0	72.0
West	90.0	87.0*	89.0	79.5
Detroit	92.0	88.0	99.0	73.0
Buffalo	100.0	100.0	100.0	75.0
Cleveland	92.5	82.0*	80.5	73.0
Birmingham	85.5	79.0	74.0	80.0
S. Ohio River	70.0	78.5	93.0	73.5
Wheeling	96.0	97.0*	101.0	80.0
St. Louis	103.0	86.5	87.5	35.5
Northeast	94.0	92.0	73.5	74.5
Aggregate	88.5	87.0*	83.0	74.0

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
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Composite prices

Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$36.33	\$35.83	\$34.50	\$25.33

Nonferrous

Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	33.00	33.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	12.80
Magnesium, ingot	27.75	27.75	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	90.125	91.25	86.75	85.25
Zinc, E. St. Louis	11.50	11.50	11.50	9.25

See Demand Upsurge in March

Warehousemen see indications of solid increase for second quarter . . . Steel sales head warns purchasing agents to watch international situation, build inventories.

♦ **BOOMING** steel demand has not yet caught up with the warehouses, but there are signs here and there that this market will begin moving up in the near future.

Warehouse men have been optimistic for weeks but the improvement to date has been more or less spotty except in a few places where a rush of ordering has developed within the last several weeks.

Generally, warehouse demand is not firm enough to indicate a definite turn for the better. Nevertheless, February has shown some improvement and a real upsurge is looked for in March and April.

Meanwhile, overall steel demand is showing increasing strength. And a steel sales executive warned a group of purchasing agents that large corporations should look to their inventories in view of the touchy international situation. ". . . I firmly believe that the international situation behooves the large corporations in this country to maintain large inventories," said John E. Timberlake, vice-president of sales, Jones & Laughlin Steel Corp.

Railroads are gradually increasing their contribution to the market's strength. The Southern Railway System has placed an order with Railway Maintenance Corp., Pittsburgh, for \$2.5 million worth of track maintenance equipment covering a total of 82 machines. Delivery will begin immediately and extend through 1955.

Due to increasing demand for linepipe, National Tube Div. of U. S. Steel resumed operations this week on its electric weld pipe mill at National Works.

Consolidated Western Steel Div. of U. S. Steel Corp. has announced its entry into guard rail fabrication for distribution in far west.

SHEETS AND STRIPS . . . Large consumers are pressuring the mills for space on cold-rolled sheet delivery schedules. Some small users claim they are being pushed around in the scramble. Ingots for conversion have been offered to an automotive buyer—but there was no sale. Car makers are booking cold-rolled sheet 90 days ahead, would extend orders further if mills would accept. Hot-rolled sheet extended to 11 weeks on wide widths, to 5 weeks on narrow gages; drawing quality hot-rolled is at a premium.

STAINLESS . . . Demand from auto manufacturers has tightened strip demand to 8 weeks in some centers. U. S. Steel Corp. is producing cold-rolled strip at Gary by slitting wide sheets. Product is being marketed at a ¼¢ per lb. premium.

GALVANIZED SHEETS . . . Order books are solid through first half on continuous. In the East, deliveries are extended through July; hot-dip is booked through May.

BARS . . . Reinforcing bars showing new activity on West Coast; general construction pickup is bringing the mills a lot of calls for bars for highway construction, flood control work, and home building. Alloy and carbon bars in small sizes are tight in Detroit. One bar maker is booked through May on sizes 2½-in. and under for rounds and equivalent area

for others. Mills still have some room for short-term delivery on cold-finished bars in Cleveland; no big rush expected on these, although volume has been steady. Some cold-finished bars advancing to 75 days, even 90 on specialties in Chicago; hot-rolled bar has some producers making best showing in February since 1953; three to four week delivery on hot-rolled; alloy improving.

STRUCTURALS . . . With construction season approaching, wide-flange beams are becoming extremely tight. It is difficult to book space on a large midwestern mill. Standards are improving, probably will become tighter as warm weather materializes.

PLATES . . . A combination of increased consumption and inventory-building is tightening market in Chicago and elsewhere. Effect of demand for electricweld pipe for pipeline applications is becoming apparent. Railroad demand is improving slowly. Mills are moving back lead time rates in Chicago.

PIPE AND TUBE . . . Oil country demand is improving with inventory-correction apparently completed. Although producers look for oil well drilling to be as good or better than last year, increased capacity likely will avert the tight markets of 1953 and first three quarters of 1954. With major pipeline projects expected to get underway in spring and summer, outlook for seamless and electricweld line pipe is good. Some sources look for a tight linepipe market to develop in second quarter. Butt weld demand is good and market firm in view of good construction prospects. Pipe skelp demand getting strong in the Midwest. Mechanical and pressure tubing also looking up.

WAREHOUSE . . . Some increased buying by aircraft and oil tool industries has warehousemen hoping for larger orders on West Coast; but orders aren't heavy enough yet to establish any trend. Some established warehousemen claim fringe operators are price chiseling on flat-rolled products. A large warehouse in Cleveland says January was its best month since January 1954; February is expected to be still better and March the top month for the year. In Chicago, market continues to advance with strength anticipated through March and April; levels still not what they once were but salespeople think February will be best since 1953.

Purchasing Agent's Checklist

- PLATE:** Pipelines will boom consumption this spring. . . . p. 51
- URANIUM:** Need more processors now p. 54
- STEEL:** Research markets new alloys p. 55
- MANUFACTURING** Hot extrude steel shapes p. 56

Comparison of Prices

(Effective Feb. 15, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Feb. 15 1955	Feb. 8 1955	Jan. 18 1955	Feb. 14 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.515
Plates	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.975
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	\$5.50	\$5.50	\$5.50	\$5.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Re-rolling billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, re-rolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.534¢

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rail, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Feb. 15 1955	Feb. 8 1955	Jan. 18 1955	Feb. 16 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.19	\$61.19	\$61.19	\$61.19
Foundry, Valley	60.48	60.48	60.48	60.48
Foundry, Southern, Cin'ti	60.48	60.48	60.48	60.48
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	\$56.59	\$56.59	\$56.59	\$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$38.50	\$36.50	\$36.50	\$36.50
No. 1 steel, Phila. area	37.00	36.50	32.50	24.50
No. 1 steel, Chicago	33.50	34.50	34.50	25.00
No. 1 bundles, Detroit	20.00	20.00	27.50	20.50
Low phos., Youngstown	36.50	36.50	36.50	29.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	41.50
No. 1 mach'y cast, Philadelp.	43.50	43.50	42.00	39.00
No. 1 mach'y cast, Chicago	45.00	45.00	45.00	34.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$36.33	\$35.83	\$34.50	\$35.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.38	\$14.38	\$14.38	\$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	30.00	29.75¢
Copper, Lake, Conn.	33.00	33.00	30.00	30.00
Tin, Straits, New York	90.125¢	91.25¢	86.75	85.25
Zinc, East St. Louis	11.50	11.50	11.50	9.25
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	65.00
Magnesium, ingot	27.75	27.75	27.75	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on P. 151 →

Producing Point	Basic	Fdry.	Mail.	Boas.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham B3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo I1	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	57.00		
Cleveland A5	56.00	56.50	57.00	61.00	
Cleveland R3	56.00	56.50	57.00		
Danversfield L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	57.00		
Erie I4	56.00	56.50	57.00		
Everett M6		61.00	61.50		
Farmers K1	62.00	62.50			
Gowens Utah C7	56.00	56.50			
Granite City G2	57.50	58.40	58.90		
Hubbard Y1			56.50		
Minneapolis C6	58.00	59.00	59.00		
Monrovia P6	56.00				
Norville I4	56.00	56.50	56.50		
Pittsburgh U1	56.00		57.00		
Shaversville S3	56.00	56.50	57.00		
So. Chicago R3	56.00		56.50		
Stouffville B3	58.00	58.50	59.00	59.50	64.00
Svealand A2	58.00	58.50	59.00	59.50	
Teledo I4	56.00	56.50	57.00		
Troy, N. Y. R3	56.00	56.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	
M. Tomsawda T1	56.50	57.00			

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 32¢ per ton for 0.5 to 0.75 pct nickel, 31¢ for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery iron: Buffalo, I1, \$64.25; Jackson, J1, G1, \$65.00. Add \$1.00 per ton for each 0.50 pct silicon over base (\$0.1 to 0.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are \$1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	347 Ch	410	416	430
Ingot, re-rolling	16.75	17.75	19.25	19.00	29.75	23.50	35.50	14.00	—	14.25
Slabs, billets, re-rolling	21.00	23.25	23.25	24.50	30.00	30.25	46.75	18.25	—	18.50
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	31.75
Billets, forging	30.00	30.25	32.75	31.75	46.25	38.00	54.75	24.00	24.00	24.00
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.25
Plates	37.75	38.00	40.25	40.50	60.50	46.50	60.25	30.00	30.50	30.50
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.75
Strip, hot-rolled	38.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.00
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50	51.25	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Slabs: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md., E1; Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, Ind., J4; Philadelphia, Pa., D5.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leachburg, Pa., A3; Bridgeville, Pa., U2; Detroit, Md., M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, O., S3; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (.25¢ per lb higher) W1 (.25¢ per lb higher); New Bedford, Mass., R5.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Middletown, O., A7; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, Ill., A5; Canton, O., T5; Ft. Wayne, Ind., J4; Philadelphia, Pa., D5.

Wire: Waukegan, Ill., A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind., J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monrovia, Pa., P1; Syracuse, N. Y., C11; Bridgeville, Pa., U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, N. Y., C11.

Plates: Brackenridge, Pa., A3; Chicago, Ill., U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Conneville, Pa., C15 Philadelphia, D5.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Farnham, Mich., A3; Washington, Pa., J2.

Forgings (blasts): Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, Pa., F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

Strong Market Moved Upward

Price increases reflect the increased operating rate in several districts . . . Openhearth grades rise \$2 in Pittsburgh . . . Composite moves up 50¢ to \$36.33 per ton.

♦ A STRONG, rising scrap market reflected the increased operating rates reported from several districts. Purchase in Pittsburgh by an independent mill moved the price of openhearth grades up by \$2.

In Philadelphia strong market conditions stabilized the price of No. 1 heavy melting steel at \$37. Reflecting these increases THE IRON AGE Heavy Melting Steel Scrap Composite moved up 50¢ to \$36.33 per gross ton.

Eastern markets showed up particularly strong with increases of 50¢ per ton and \$1 per ton on No. 1 heavy reported from Buffalo and Boston respectively.

In Chicago a mill purchase early this week forced down both industrial and dealer grades in steelmaking scrap. New No. 1 heavy melting price for Chicago is \$33 to \$34 per gross ton.

Pittsburgh . . . No. 1 and No. 2 heavy melting moved up \$2 per ton this week on basis of a purchase by an independent mill. Market is strong and prices may move higher despite efforts of consumers to increase ratio of hot metal to scrap. Following a pattern set in an earlier deal, the independent mill established "local" and "out-of-district" prices on openhearth grades. The differential is \$2 per ton, but from a practical standpoint the so-called out-of-district price of \$39 on No. 1 and \$36 on No. 2 prevailed. Latest railroad list is \$2 higher at \$41 for No. 1 railroad. Blast furnace grades are up \$2 per ton.

Chicago . . . A new mill purchase on Monday moved down both industrial and dealer grades in steelmaking scrap as factory bundles began moving at \$36 and industrial No. 1 heavymelting at \$35, with dealer No. 1 heavy \$1 lower. No. 2 heavy

dealer moved to \$32. Local market picture had been confused over the week previous by reports of strong mill inventories and a high rejection rate centering around No. 1 dealer bundles. No. 2 dealer bundles held at previous price levels.

Philadelphia . . . Broker buying stabilized at no less than \$37.00 a ton on No. 1 heavy melting steel in anticipation of mill purchases of considerable tonnages. As of press time however, sales were not consummated. Tone of the market is very firm throughout. Purchases by foundries in the outer edges of the district moved cupola cast up \$2 to \$38 a gross ton. Activity sent railroad steel wheels and springs up \$1. Large tonnages of openhearth grades reported moving out of dealer's yards at currently prevailing prices.

Cleveland . . . Blast furnace scrap was still the hottest item in Cleveland area last week with some dealers holding out for higher price. One mill bought openhearth scrap at prevailing price of \$34.50. Tonnage was substantial but under usual amount. Brokers are paying high speculative prices on railroad scrap. Some No. 1 bundles went at \$1 over market on basis of delivery from special yard. Valley market continues in doldrums on new sales with mills awaiting new industrial lists.

Buffalo . . . Prices continued to edge forward in the market here. Local and outside buying lifted prices on No. 1 steelmaking grades an additional 50¢ a ton. Machine shop turnings also jumped 50¢.

Detroit . . . A quiet but firm market prevailed in Detroit although dealer purchases at a local mill were slowed down because of heavy shipments of industrial scrap. No new orders from local or outside consumers have materialized, but most of the trade is comfortably busy filling orders placed at the first of the month.

St. Louis . . . The steel operating rate jumped sharply to 102.7 pct, the highest for the district since an October 1953 rate of 107 pct. Mills are said to have sufficient inventories for 30 days consumption and receipts are equal to the melt. Business is expected to continue good for the first half of 1955. A Texas mill has set up a new price schedule, reducing nearby prices \$1, unchanging mid-distance rates and advancing distant points \$1, which has not affected this market. Prices remain unchanged.

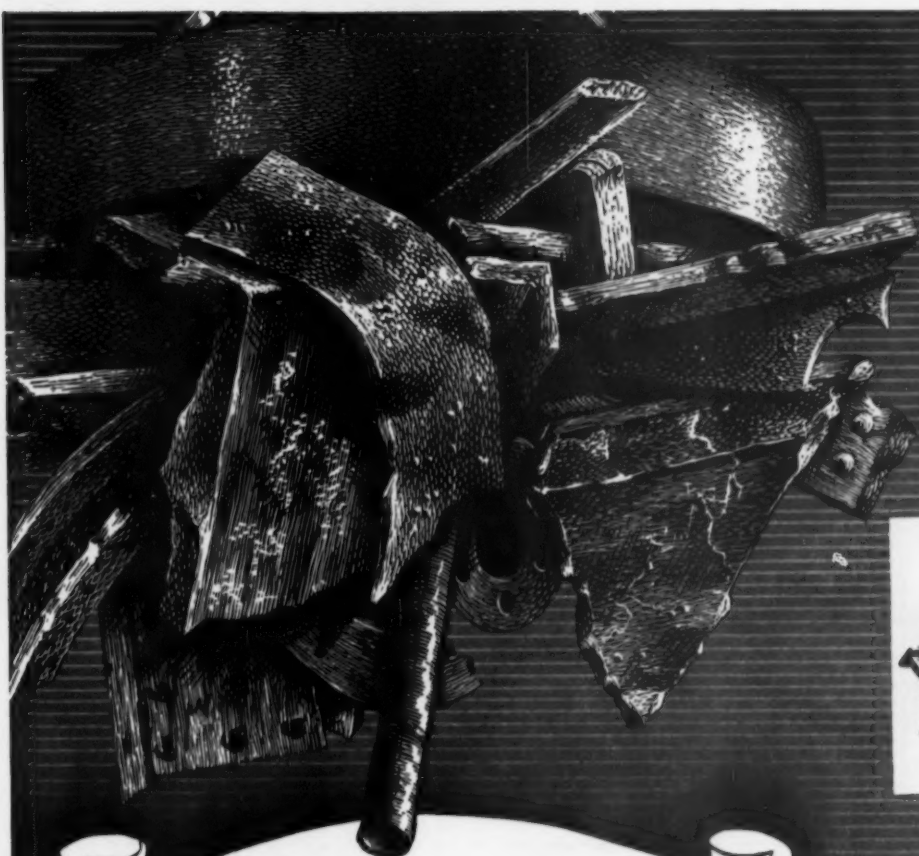
Boston . . . Fair activity has again been recorded in the New England scrap market as No. 1 steelmaking grades advanced another \$1 per ton. Eastern Pennsylvania mills and exporters comprise the major portion of the market.

New York . . . Market tone is extremely firm reflecting solid orders from Eastern Pennsylvania mills. No price changes indicated at press time but brokers anticipate further increase on openhearth grades soon.

Birmingham . . . Southern steel mills this month placed orders at existing prices and brokers say they are having a hard time filling them because of resistance on the part of dealers who feel mills should increase their prices in view of the premium being paid by exporters. Dealers say scrap is coming into the yards fairly well but they could get much more if they could pay more for it. Cast is in good demand at unchanged prices but there is still a short supply.

Cincinnati . . . Dealers are finding out-of-town markets their best source with another 7000 tons by barge to Pittsburgh. No. 2 bundles from the Cincinnati area are delivering in Pittsburgh for \$32. Rails are also showing some life with \$1 per ton increase. Impending foundry strike has dampened cast market. One area mill bought very small tonnage under market price but other dealers rejected offers.

West Coast . . . Scrap exports continue strong in the San Francisco area with the mills resisting the higher export prices. Export steel is reputed to be going at "mill prices and some a bit higher. If the mills wanted to buy any substantial quantities of scrap now, they'd have to pay higher prices," one spokesman asserted. Los Angeles and Seattle prices also remain unchanged.



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Scrap Prices (Effective Feb. 18, 1955)

Pittsburgh

No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. punch'gs, plate	41.00 to 42.00
Heavy turnings	35.00 to 36.00
No. 1 RR. hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	44.00 to 45.00
RR. spring steel	44.00 to 45.00
RR. couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast	38.00 to 39.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	\$32.00 to \$34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 factory bundles	35.00 to 36.00
No. 1 dealers' bundles	33.00 to 34.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	28.00 to 29.00
Low phos. punch'gs, plate	36.00 to 37.00
Low phos. 3 ft and under	35.00 to 37.00
No. 1 RR. hvy. melting	27.00 to 28.00
Scrap rails, random lgth.	40.00 to 41.00
Rerolling rails	49.00 to 50.00
Rails 3 ft and under	47.00 to 48.00
Locomotive tires, cut	38.00 to 39.00
Cut bolsters & side frames	37.00 to 38.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	41.00 to 42.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	31.00 to 32.00
Cast iron car wheels	35.00 to 36.00
Malleable	43.00 to 45.00
Stove plate	34.00 to 35.00

Philadelphia Area

No. 1 hvy. melting	\$37.00
No. 2 hvy. melting	34.00
No. 1 bundles	37.00
No. 2 bundles	\$28.00 to 29.00
Machine shop turn.	20.50 to 21.50
Mixed bor. short turn.	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	38.00 to 39.00
Low phos. 3 ft and under	39.00 to 40.00
Low phos. punch'gs	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	35.00 to 36.00
RR. steel wheels	40.00 to 41.00
RR. spring steel	40.00 to 41.00
Rails 18 in. and under	50.00 to 51.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	27.00 to 28.00
Cast iron car wheels	43.00 to 44.00
Malleable	43.00 to 44.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	43.00 to 44.00
Charging box cast.	35.00 to 36.00

Cleveland

No. 1 hvy. melting	\$23.50 to \$24.50
No. 2 hvy. melting	30.00 to 31.50
No. 1 bundles	33.50 to 34.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Cut struct'l & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	33.00 to 34.00
Low phos. punch'gs, plate	33.50 to 34.50
Foundry steel, 3 ft & under	27.00 to 28.00
No. 1 RR. heavy melting	24.00 to 25.00
Rails 3 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	39.00 to 40.00
Malleable	44.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	27.50 to 28.50
Machine shop turn.	20.00 to 21.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. plate	26.00 to 27.00

Buffalo

No. 1 hvy. melting	\$31.50 to \$32.50
No. 2 hvy. melting	27.50 to 28.50
No. 1 busheling	31.50 to 32.50
No. 2 bundles	25.50 to 26.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	32.50 to 34.50
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	26.00 to 27.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$28.50 to \$29.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles, openhearth	23.50 to 24.50
No. 2 bundles	22.00 to 23.00
New busheling	27.00 to 28.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. punch'gs, plate	23.50 to 24.50
No. 1 cupola cast.	34.00
Heavy breakable cast.	26.00
Stove plate	30.00
Automotive cast.	38.00

St. Louis

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	34.00 to 35.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	45.50 to 46.50
Locomotive tires, uncut	33.50 to 34.50
Angles and splice bars	33.50 to 34.50
Std. steel car axles	34.50 to 35.50
RR. spring steel	27.00 to 28.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	33.00 to 34.00
Cast iron brake shoes	29.00 to 30.00
Stove plate	34.00 to 35.00
Cast iron car wheels	24.50 to 25.50
Malleable	35.00 to 36.00
Unstripped motor blocks	22.50 to 23.50

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	25.00 to 26.00
Elec. furnace, 3 ft & under	27.00 to 28.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and short turn.	11.00 to 12.00
Shoveling turnings	12.00 to 13.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	27.50 to 28.50
No. 2 bundles	23.50 to 24.50
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	22.00 to 23.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	28.00 to 29.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	29.00 to 30.00
Bar crops and plate	33.00 to 34.00
Structural and plate, 2 ft.	32.00 to 33.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	37.00 to 38.00
Rails, 18 in. and under	41.00 to 42.00
Angles & splice bars	38.00 to 39.00
Rerolling rails	42.00 to 43.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.50 to 36.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos., 18 in. & under	36.00 to 37.00
Rails, random lengths	40.00 to 41.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	\$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	22.00
No. 2 bundles	18.00
No. 3 bundles	14.00
Machine shop turn.	6.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	24.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	\$28.00
No. 2 hvy. melting	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	28.00
No. 1 RR. hvy. melting	28.00
No. 1 cupola cast.	\$41.00 to 42.00

Seattle

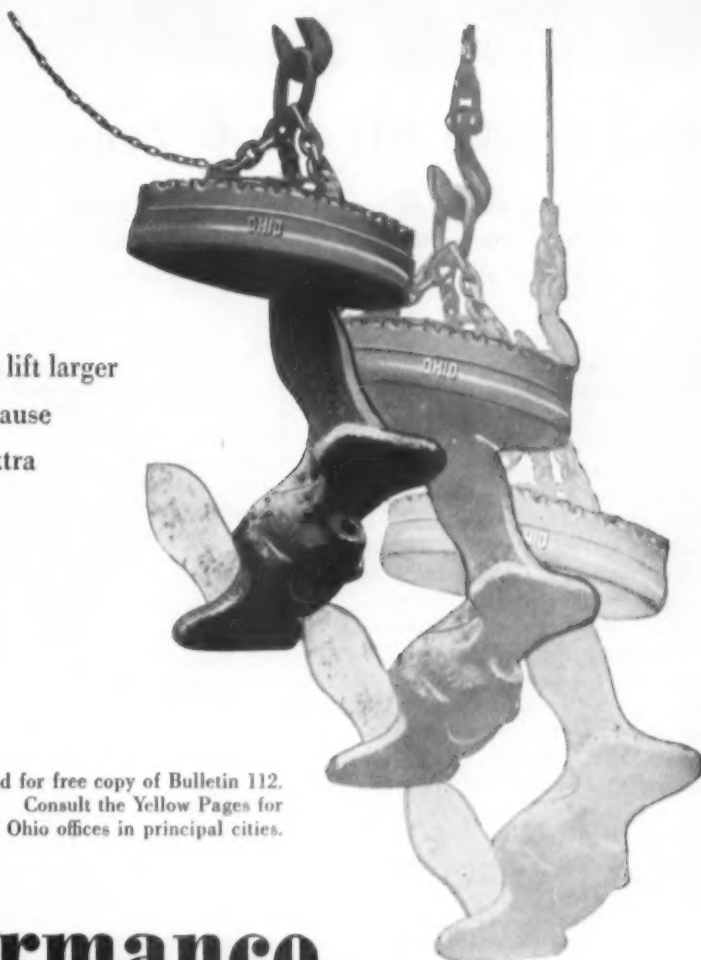
No. 1 hvy. melting	\$29.00
No. 2 hvy. melting	25.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	14.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	\$32.00
No. 2 hvy. melting	28.00
No. 1 bundles	32.00
No. 2 bundles	26.00
Mixed steel scrap	26.00
Bushings	27.00
Bush., new fact prep'd.	30.00
Bush., new fact unprep'd.	26.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, rerolling	41.00
Cast scrap	\$42.00 to 45.00

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Chester Bland
President

Zinc Stocks Off 7000 Tons

January slab zinc output set new record . . . Government buying higher . . . Order backlog up . . . Aluminum mill shipments higher . . . Copper still tough—By R. L. Hatschek.

♦ FRENZY in copper has tapered off somewhat this week. But it's still a far cry from a placid market. London price has gone as high as 45¢ per lb and consumers are still facing the real impact of the strike-caused shortage which won't hit for another month or two. And the secondary market on this side of the Atlantic is kicking up its heels. There's still speculation, too, as to whether the producers will raise prices again.

Optimism is definitely noted in zinc and aluminum. In the former, January figures show that smelter stocks have dipped again—and February business has been so good that new stockpile offers were lower than government requests. In aluminum, mill product shipments are rising.

ZINC . . . January statistics of the American Zinc Institute continue to reflect a more optimistic picture of the market. Despite a rise in production to a new alltime high and a decline in total shipments, slab zinc stocks held by smelters declined again. Unfilled orders also showed optimism by rising 11,559 tons to the highest point in the past few years.

Government stockpiling continued to be a big factor in the stock reduction.

Actual January figures were: Production 86,106 tons (up 942 tons), domestic shipments 70,863 tons (off 4037 tons), export and drawback 2644 tons (off 761 tons), to government

account 19,695 tons (up 2477 tons), total shipments 93,202 tons (off 2321 tons), stock at end of January 117,181 tons (off 7096 tons), and unfilled orders 57,421 tons (up 11,559 tons).

It seems a sure bet that this bright trend will continue for this month as well. General Services Administration came into the market for its monthly stockpile tonnage last week—but, it is reported in the trade, offers made to GSA were of smaller tonnage than previously. This is attributed to the higher rate of demand and is a definitely healthy sign. Since this is "new look" buying, designed to bolster the market, GSA certainly doesn't feel snubbed by the lighter offerings.

COPPER . . . The government has ruled that firms seeking to export copper must show that they have been in the copper export business for some time and are not newcomers to the field.

Regulations put into effect Feb. 10 by the Bureau of Foreign Commerce of the Commerce Dept. require exporters to submit on form IT-821 a statement of their participation in export of copper scrap (schedule B No. 641300) and copper-base alloy scrap (schedule B No. 644000) during the fourth quarter of 1953 and the calendar year of 1954 if the quantities shipped under each schedule B number totaled \$5000 or more in value.

The government figures this procedure will enable it to separate the historical exporters from the comelatelies. Bulk of the material available for export quotas (6000 tons for the February-March period) will be ap-

portioned among applicants with some historical position in the trade, but a small percentage will be reserved for applicants with no previous export experience.

Applicants must submit their statements not later than Feb. 28 if they intend to qualify for the February-March quota.

ALUMINUM . . . Statistical evidence of the rising aluminum market is found in the Aluminum Assn. monthly report for December. But note this: December shipments were not a peak, merely a point on the side of a rising curve—the market is still getting stronger.

Practically all mill product categories showed an increase in December over the previous month. The exceptions were minor declines in soft alloy extrusions, wire other than conductor, sand castings and foil. And remember that November's foil shipments were an alltime record.

Total shipments of the products listed for 1954, the first time that annual figures are available, added up to 1,063,843 tons. This figure in itself is not too significant as some products are completely omitted and the industry is not covered 100 pct. But it's interesting to note that sheet and plate total 48.0 pct, foil 7.2 pct, extrusions 13.2 pct, drawn tubing 2.7 pct, rod and bar 6.8 pct, wire other than conductor 1.2 pct, ACSR and cable 5.2 pct, forgings 2.1 pct, and castings 13.1 pct.

Following are aluminum mill products shipments reported by the Aluminum Assn. for December and totals for 1954. Figures for all products are in net tons.

	Dec.	1954
Sheet & Plate, total	47,538	510,241
Non-Heat Treatable	36,584	395,465
Heat Treatable	10,954	114,776
Foil	7,815	76,595
Extruded Products, total	13,316	140,131
Soft Alloys	11,128	110,329
Hard Alloys	2,188	29,801
Tube, Drawn, total	2,580	29,073
Soft Alloys	2,327	25,285
Hard Alloys	253	3,788
Rod & Bar, Rolled	6,009	72,002
Wire Other than Conductor	1,779	18,848
ACSR & Cable, Bare	4,274	54,957
Forgings	2,117	22,721
Castings, total	14,305	139,275
Sand	787	10,460
Permanent Mold	6,962	65,857
Die	6,557	62,959

LEAD . . . GSA also came into the market for stockpile lead last week. But it's assumed that there was no holding out by sellers as in the case of zinc. The market is generally described as moderate, with tonnages not quite up to those of recent weeks.

The London market, too, is more moderate this week with prices only a shade over parity with New York.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Feb. 9	Feb. 10	Feb. 11	Feb. 12	Feb. 14	Feb. 15
Copper, electro, Conn.	33.00	33.00	33.00	33.00	33.00	33.00
Copper, Lake, delivered	33.00	33.00	33.00	33.00	33.00	33.00
Tin, Straits, New York	91.625	91.00	91.00	90.125	90.125*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices

*Tentative

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet		Plate	
	0.032 in.	0.081 in.	0.136- 0.249 in.	0.250- 3.000 in.
1100, 3003.....	39.1	37.1	35.9	35.5
8004.....	44.0	39.8	38.1	37.6
5052.....	46.7	41.9	40.3	39.3
2024-O, -OAL.....	49.4	40.8	39.3	39.4
7075-O, -OAL.....	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 35.7¢ to 66.7¢; 12 to 14, 39.4¢ to \$1.04; 24 to 36, 42.3¢ to \$1.85; 36 to 38, 49.5¢ to \$1.97.
Red. Round: Rolled, 1.964-4.5 in. 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in. 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, 1/4-11/32 in., 63.5¢ to 59.1¢; 3/8-1 1/2 in., 49.9¢ to 46.9¢; 1 9/16-3 in., 46.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.5¢; 6052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1 1/2-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032 in., 42 1/2 x 60 in., \$2.998; x 96 in., \$4.801; x 120 in., \$6.992; x 144 in., \$7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O 1/4 in., 55¢; 3/16 in., 67¢; 1/2 in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 77¢; 1/2 to 3/4 in., 60.5¢; 1 1/4 to 1.749 in., 56¢; 2 1/2 to 5 in., 51.5¢. Other alloys higher. Base up to 1/2 in. diam, 10,000 lb; 3/4 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M, in weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 45.3¢; 0.23 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD 1/2 to 5/16 in., \$1.43; 5/16 to 1/2 in., \$1.29; 1/2 to 3/4 in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, 3/4 to 1 in., 64¢; 1 to 2 in., 60¢; 2 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1 1/2 in., 10,000 lb; 1 1/2 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$16; Plate, HR, \$12; Wire, rolled and/or drawn, \$11; Bar, HR or forged, \$9; Forgings, \$9.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR.....	102	78	99
Strip, CR.....	102	87	125
Rod, Bar, HR.....	87	69	93
Angles, HR.....	87	69	93
Plate, HR.....	97	83	95
Seamless Tube.....	122	108	153
Shot, Blocks.....		65	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper.....	51.79		51.86
Copper, h-f.....	51.76	48.11	
Copper, drawn.....		49.36	
Low brass.....	47.35	47.29	
Yellow brass.....	44.27	44.21	
Red brass.....	48.44	48.38	
Naval brass.....		42.49	43.75
Landed brass.....	44.27	35.36	41.41
Comm. bronze.....	50.08	50.02	
Mang. bronze.....		46.02	47.58
Phos. metal.....	70.12	70.62	
Muntz metal.....		42.15	43.40
Ni silver, 10 pct 58.25		40.58	
Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.			
Strip.....			\$1.71
Rod, bar, wire.....			1.68

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed.....	23.20
Aluminum pig.....	21.50
Antimony, American, Laredo, Tex.....	28.50
Beryllium copper, per lb cont'd Be.....	\$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be.....	\$72.75
Bismuth, ton lots.....	\$2.25
Cadmium, del'd.....	\$1.70
Cobalt, 97-99% (per lb).....	\$2.60 to \$2.67
Copper, electro, Conn. Valley.....	33.00
Copper, Lake, delivered.....	33.00
Gold, U. S. Treas., per troy oz.....	\$35.00
Indium, 99.8%, dollars per troy oz.....	\$2.25
Iridium, dollars per troy oz.....	\$110 to \$120
Lead, St. Louis.....	14.80
Lead, New York.....	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig.....	27.00
Ingot.....	27.75
Magnesium, sticks, 100 to 500 lb, 46.00 to 48.00	
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$322 to \$324
Nickel electro, f.o.b. N. Y. warehouse.....	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel.....	60.75
Pladium, dollars per troy oz.....	\$18 to \$20
Platinum, dollars per troy oz.....	\$82 to \$84
Silver, New York, cents per troy oz.....	86.25
Tin, New York.....	90.125
Titanium, sponge, grade A-1.....	44.50
Zinc, East St. Louis.....	11.50
Zinc, New York.....	12.00
Zirconium copper, 50 pct.....	\$6.20

REMELTED METALS**Brass Ingot**

(Cents per lb delivered, carloads)

85-5-5-5 ingot.....	
No. 115.....	33.00
No. 120.....	32.50
No. 123.....	32.00
80-10-10 ingot.....	
No. 305.....	37.00
No. 315.....	34.75
89-10-2 ingot.....	
No. 210.....	45.75
No. 215.....	42.25
No. 245.....	37.75
Yellow ingot.....	
No. 405.....	28.75
Manganese bronze.....	
No. 421.....	30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys.....	
0.30 copper, max.....	27.50-28.00
0.60 copper, max.....	27.25-27.75
Piston alloys (No. 132 type).....	26.50-27.25
Old sheet and utensils.....	25.75-26.25
108 alloy.....	26.50-27.00
195 alloy.....	26.50-27.50
13 alloy (0.60 copper max.).....	27.25-27.75
ASX-679.....	26.50-27.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1-96-97 1/4%.....	27.25-28.25
Grade 2-92-96%.....	26.25-27.25
Grade 3-90-92%.....	25.50-26.50
Grade 4-85-90%.....	24.75-25.50

ELECTROPLATING SUPPLIES**Anodes**

(Cents per lb, freight allowed, 5000 lb lots)

Copper.....	
Cast, oval, 15 in. or longer.....	44.92
Electrodeposited.....	39.78
Flat rolled.....	40.42
Brass, 80-20.....	
Cast, oval, 15 in. or longer.....	43.515
Zinc, flat cast.....	20.25
Ball, anodes.....	18.50
Nickel, 99 pct plus.....	
Cast.....	96.50*
Cadmium.....	\$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.....	94 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum.....	63.00
Copper sulphate, 99.5 crystals, bbl.....	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed.....	31.25*
Nickel chloride, 300 to 400 lb.....	43.50*
Silver cyanide, 100 oz. lots, per oz.....	75 1/2
Sodium cyanide, 96 pct domestic 200 lb drums.....	19.25
Zinc cyanide, 100 lb drum.....	54.30
*Effective Jan. 3.	

SCRAP METALS**Brass Mill Scrap**

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	29	28 1/4
Yellow brass.....	21 1/4	20 1/4
Red brass.....	25 1/4	24 1/4
Comm. bronze.....	26 1/4	25 1/4
Mang. bronze.....	29 1/4	19 1/4
Yellow brass rod ends.....	21 1/4	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	33	33 1/4
No. 2 copper wire.....	31 1/4	32
Light copper.....	30	30 1/4
Refinery brass.....		28
*Dry copper content.		

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	30 1/4	31
No. 2 copper wire.....	29	29 1/4
Light copper.....	27 1/4	28
No. 1 composition.....	26	26 1/4
No. 1 comp. turnings.....	25 1/4	26
Rolled brass.....	20	20 1/4
Brass pipe.....	20 1/4	21
Radiators.....	21	21 1/4

Mixed old cast.....	16	17
Mixed new clips.....	17 1/4	18 1/4
Mixed turnings, dry.....	16	17 1/4
Pots and pans.....	16	17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire.....	29	29 1/4
No. 2 heavy copper and wire.....	27 1/4	28
Light copper.....	26	26 1/4
New type shell cuttings.....	26	26 1/4
Auto radiators (unawated).....	18 1/4	19
No. 1 composition.....	23	23 1/4
No. 1 composition turnings.....	22 1/4	23
Unlined red car boxes.....	19 1/4	20
Cocks and faucets.....	16 1/4	17
Mixed heavy yellow brass.....	18	18 1/4
Old rolled brass.....	18	18 1/4
Brass pipe.....	19 1/4	20
New soft brass clippings.....		21
Brass rod ends.....		19
No. 1 brass rod turnings.....		18

Aluminum

Alum. pistons and struts.....	10	11
Aluminum crankcases.....	13	13 1/4
1100 (28) aluminum clippings.....		16
Old sheet and utensils.....	13	13 1/4
Borings and turnings.....	8	9
Misc. cast aluminum.....	13	13 1/4
2024 (24s) clippings.....	14 1/4	15

Zinc

New zinc clippings.....		7
Old zinc.....		5 1/4
Zinc routings.....	3 1/4	3 3/4
Old die cast scrap.....	3 1/4	3 3/4

Nickel and Monel

Pure nickel clippings.....	57	60
Clean nickel turnings.....	40	43
Nickel anodes.....	57	60
Nickel rod ends.....	57	60
New Monel clippings.....	25	26
Clean Monel turnings.....	20	21
Old sheet Monel.....	23	24
Nickel silver clippings, mixed.....	16	17
Nickel silver turnings, mixed.....	14	15

Lead

Soft scrap lead.....	11 1/4	11 3/4
Battery plates (dry).....	6	6 1/4
Batteries, acid free.....		4 1/4

Magnesium

Segregated solids.....	18 1/4	19
Castings.....	17 1/2	18

Miscellaneous

Block tin.....	70	75
No. 1 pewter.....	50	55
No. 1 auto babbitt.....		45
Mixed common babbitt.....	12	12 1/4
Solder joints.....		17
Siphon tops.....		15
Small foundry type.....	16 1/4	16 3/4
Monotype.....	15	15 1/4
Lino. and stereotype.....	14 1/4	14 3/4
Electrotype.....	12 1/4	12 3/4
Hand picked type shells.....	10 1/4	10 3/4
Lino. and stereo. dross.....		6 1/4
Electro dross.....		5

IRON AGE

STEEL
PRICES(Effective
Feb. 15, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
		Carbon Revolving Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.			\$86.00 B3		4.30 B3	6.45 B3	4.30 B3						
	Buffalo, N. Y.	\$64.00 B3	\$78.00 B3, R3	\$86.00 B3, R3	5.975 B3	4.30 B3	6.45 B3	4.30 B3	4.95 B3,R3	5.75 B3,R7	6.15 B3	8.425 B3		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.10 A2	5.80 A2	6.15 A2			
	New Bedford, Mass.									6.20 R6				
	Johnstown, Pa.	\$64.00 B3	\$78.00 B3	\$86.00 B3		4.30 B3	6.45 B3		4.95 B3					
	Fairless, Pa.													
	New Haven, Conn.									6.20 D1 6.50 A5				
	Phoenixville, Pa.					3.95 P2		3.95 P2						
	Sparrows Pt., Md.								4.95 B3	5.75 B3	6.15 B3	8.425 B3		
	Bridgport, Wallingford, Conn.	\$60.00 N8	\$83.00 N8						4.35 N8	6.30 W1			7.90 N8	
	Pawtucket, R. I. Worcester, Mass.									6.30 N7 6.60 A5				12.75 A5 12.80 N7
MIDDLE WEST	Alton, Ill.								4.225 L1					
	Ashland, Ky.								4.95 A7					
	Canton-Massillon, Dever, Ohio		\$80.00 R3	\$86.00 R3, T3										12.45 G4
	Chicago, Ill.	\$64.00 U1	\$78.00 R3, U1,W8	\$86.00 U1, W8,R3	5.975 U1	4.25 U1, W8	6.40 U1, Y1	4.25 U1	4.95 A1,N4 W8	5.85 A1				
	Cleveland, Ohio									5.75 A5,J3		8.60 A5		12.45 A5
	Detroit, Mich.			\$86.00 R3					4.15 G3,M2	5.85 D1,D2, G3,M2,P11	6.25 G3	8.70 D2, G3		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	\$64.00 U1	\$78.00 U1	\$86.00 U1, Y1	5.975 J3	4.25 J3, U1	6.40 U1, J3		4.95 J3, U1,Y1	5.85 J3	6.15 U1, J3,Y1	8.60 Y1	6.70 U1, Y1	
	Sterling, Ill.								4.15 N4					
	Indianapolis, Ind.									5.90 C5				
	Newport, Ky.												6.70 Y5	
	Middletown, Ohio									5.75 A7				
	Niles, Warren, Ohio Sharon, Pa.								4.95 S1,R3	5.75 S1,R3, T4	6.15 S1, R3	8.60 S1, R3	6.70 S1	12.45 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$64.00 U1, J3	\$78.00 J3, U1,C11	\$86.00 U1, C11	5.975 U1	4.25 J3, U1	6.40 J3, U1	4.25 U1	4.95 P6	5.75 B4,J3			6.70 S9	12.45 S9
	Portsmouth, Ohio								4.95 P7	5.75 P7				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 W3			4.95 W3	5.75 F3,W3	6.15 W3	8.60 W3		
	Youngstown, Ohio		\$78.00 C10	\$86.00 Y1, C10		4.25 Y1	6.40 Y1		4.95 U1,Y1	5.75 Y1,C5	6.15 U1, Y1	8.60 Y1	6.70 U1, Y1	12.45 C5
WEST	Fontana, Cal.	\$72.00 K1	\$86.00 K1	\$105.00 K1		4.90 K1	7.05 K1	5.25 K1	4.925 K1	7.45 K1	7.25 K1		6.10 K1	14.95 K1
	Geneva, Utah		\$78.00 C7			4.25 C7	6.40 C7							
	Kansas City, Mo.					4.30 S2	6.45 S2		4.30 S2		6.40 S2		6.95 S2	
	Los Angeles, Torrance, Cal.		\$87.50 B2	\$106.00 B2		4.95 B2, C7	7.10 B2		4.80 B2,C7	7.80 C1				
	Minneapolis, Colo.					4.70 C6			5.15 C6					
	Portland, Ore.					5.06 O2								
	San Francisco, Niles, Pittsburg, Cal.		\$87.50 B2			4.90 B2 4.95 P9	7.05 B2		4.80 B2,C7					
	Seattle, Wash.		\$91.50 B2			5.80 B2	7.15 B2		5.95 B2, P12					
	Atlanta, Ga.								4.25 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$64.00 T2	\$78.00 T2			4.25 C16, R3,T3	6.40 T2		4.95 R3, T2,C16		6.15 T2			
SOUTH	Houston, Tex.		\$83.00 S2	\$91.00 S2		4.30 S2	6.45 S2		4.30 S2		6.40 S2		6.95 S2	

IRON AGE		States identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
STEEL PRICES (Effective Feb. 15, 1955)		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE	
		Hot-rolled 18 ga. & heavier	Cold-rolled	Galvanized 18 ga.	Enamel- ing 12 ga.	Long Terns 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.	Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.85 B3	4.95 B3				6.10 B3	7.50 B3		4.675 W6	†Special coated mil- lions deduct 9¢ from 1.25-lb. coke base/box price. Can-making quality blackplate/55 to 125 lb. deduct \$2.20 from 1.25-lb. coke base/box. * COKE: 1.50-lb. add 25¢. * ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.10. Differ- ential 1.00 lb./0.25 lb. add 65¢.			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 A2	5.00 A2				6.15 A2							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.								4.675 B3					
	Fairless, Pa.	4.10 U1	5.00 U1				6.15 U1	7.55 U1			\$8.90 U1	\$7.60 U1		
	New Haven, Conn.													
Phoenixville, Pa.														
Sparrows Pt., Md.	4.05 B3	4.95 B3	5.45 B3			6.10 B3	7.50 B3	8.20 B3	4.775 B3	\$8.90 B3	\$7.60 B3			
Worcester, Mass.									4.975 A5					
Trenton, N. J.														
MIDDLE WEST	Alton, Ill.									4.85 L1				
	Ashland, Ky.	4.05 A7		5.45 A7	5.375 A7									
	Canton-Massillon, Ohio			5.45 R1, R3					5.175 R1					
	Chicago, Joliet, Ill.	4.05 A1, W8					6.10 U1			4.675 A5, N4, R3				
	Sterling, Ill.									4.775 N4				
	Cleveland, Ohio	4.05 J3, R3	4.95 J3, R3		5.375 R3		6.10 J3, R3	7.50 J3, R3		4.675 A5				
	Detroit, Mich.	4.15 G3, M2	5.05 G3				6.20 G3	7.60 G3						
	Newport, Ky.	4.05 N5	4.95 N5	5.45 N5										
	Gary, Ind. Harbor, & Indiana	4.05 J3, U1, Y1	4.95 J3, U1, Y1	5.45 U1, J3	5.375 J3, U1	5.85 U1	6.10 U1, J3, Y1	7.50 U1, Y1		4.675 Y1	\$8.80 J3, U1, Y1	\$7.50 J3, U1, Y1	6.20 U1, Y1	
	Granite City, Ill.	4.25 G2	5.15 G2	5.65 G2	5.575 G2							\$7.60 G2	6.30 G2	
	Kokomo, Ind.	4.15 C9		5.55 C9					5.20 C9	4.775 C9				
	Mansfield, Ohio					5.85 E2			5.175 E2					
	Middletown, Ohio		4.95 A7		5.375 A7	5.85 A7								
	Niles, Ohio	4.05 S1, R3	4.95 R3	5.45 N3	6.725 N3	5.85 N3	6.10 S1, R3	7.50 R3			\$8.80 R3	\$7.50 R3		
	Sharon, Pa.	5.30 N3	5.975 N3											
Pittsburgh, Pa.	4.05 J3, U1, P6	4.95 J3, U1, P6	5.45 U1	5.375 U1		6.10 J3, U1	7.50 J3, U1	8.20 U1	4.675 A5, 4.875 P6	\$8.80 J3, U1	\$7.50 J3, U1	6.20 U1		
Midland, Pa.														
Butler, Pa.														
Portsmouth, Ohio	4.05 P7	4.95 P7							4.675 P7					
Weirton, Wheeling, Follansbee, W. Va.	4.05 W3, W5	4.95 W3, W5, F3	5.45 W3, W5		5.85 W3, W5	6.10 W3	7.50 W3			\$8.80 W3, W5	\$7.50 W3, W5	6.20 F3, W5		
Youngstown, Ohio	4.05 U1, Y1	4.95 Y1		5.375 Y1		6.10 U1, Y1	7.50 Y1		4.675 Y1					
WEST	Fontana, Cal.	4.825 K1	6.05 K1				6.875 K1	8.55 K1		5.475 K1				
	Geneva, Utah	4.15 C7												
	Kansas City, Mo.									4.925 S2				
	Los Angeles, Torrance, Cal.									5.475 C7, R2				
	Minneapolis, Colo.									4.925 C6				
	San Francisco, Niles, Pittsburg, Cal.	4.75 C7	5.90 C7	6.20 C7						5.325 C7	\$9.55 C7	\$8.25 C7		
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala.	4.05 R3, T2	4.95 T2	5.45 R3, T2			6.10 T2			5.35 R3	4.675 T2, R3	\$8.90 T2	\$7.60 T2	
	Alabama City, Ala.													
Houston, Texas										4.925 S2				

IRON AGE

STEEL
PRICES(Effective
Feb. 15, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Flower Plate	Alloy	Hi Str. Low Alloy	
EAST	Bothlehem, Pa.				5.075 B3	6.025 B3	6.45 B3					
	Buffalo, N. Y.	4.30 B3,R3	4.30 B3,R3	5.45 B5	5.075 B3,R3	6.025 B3,B5	6.45 B3	4.225 B3,R3			6.45 B3	5.75 W6
	Claymont, Del.							4.225 C4		5.80 C4		
	Coatesville, Pa.							4.225 L4		5.80 L4	6.45 L4	
	Conshohocken, Pa.							4.225 A2	5.275 A2		6.45 A2	
	Harrisburg, Pa.							3.975 C3	5.275 C3			
	Hartford, Conn.			5.90 R3		6.925 R3						
	Johnstown, Pa.	4.30 B3	4.30 B3		5.075 B3		6.45 B3	4.225 B3		5.80 B3	6.45 B3	5.75 B3
	Fairless, Pa.	4.45 U1	4.45 U1		5.225 U1							
	Newark, N. J.			5.85 W10		6.80 W10						
	Camden, N. J.			5.85 P10								
	Bridgeport, Putnam, Conn.	4.55 N8		5.95 W10	5.225 N8			4.475 N8				
MIDDLE WEST	Sparrows Pt., Md.		4.30 B3					4.225 B3		5.80 B3	6.45 B3	5.85 B3
	Palmer, Worcester, Needville, Mansfield, Mass.			5.85 W11 5.95 B5,C14		6.925 A5,B5						6.85 A5, W6
	Alton, Ill.	4.50 L1										5.925 L1
	Ashland, Newport, Ky.							4.225 A7,N5		5.80 N5		
	Canton-Massillon, Mansfield, Ohio	4.40 R3		5.40 R2,R3	5.075 R3,T5	6.025 R2,R3, T5		4.225 E2				
	Chicago, Juliet, Ill.	4.30 U1, N4,W8,R3	4.30 N4,R3	5.40 A5,W10, W8,B5,L2	5.075 U1,R3, W8	6.025 A5,W8, W10,L2,B5		4.225 U1,W8, I3,A1,R3	5.275 U1	5.80 U1	6.45 U1	5.75 A5, R3,N4,W7
	Cleveland, Ohio	4.30 R3	4.30 R3	5.40 A5,C13		6.025 A5,C13	6.45 R3	4.225 J3,R3	5.275 J3		6.45 J3,R3	5.75 A5, C13
	Detroit, Mich.	4.40 G3 4.45 R3		5.40 R3 5.80 B5,P8 5.85 P3	5.075 R5 5.175 G3	6.025 R5 6.825 B5,P3, P8	6.55 G3	4.325 G3			6.55 G3	
	Duluth, Minn.											5.75 A5
	Gary, Ind. Harbor, Crawfordsville	4.30 I3, U1, Y1	4.30 I3, U1, Y1	5.40 M5,R3	5.075 I3, U1, Y1	6.025 M5, R3	6.45 U1,I3, Y1	4.225 I3, U1, Y1	5.275 I3	5.80 U1, Y1	6.45 U1,I3, Y1	5.85 M4
	Granite City, Ill.							4.425 G2				
	Kokomo, Ind.											5.85 C9
	Sterling, Ill.	4.40 N4	4.40 N4									5.85 N4
WEST	Niles, Ohio Sharon, Pa.	4.30 R3					6.45 R3	4.225 S1,R3		5.80 S1	6.45 S1	
	Pittsburgh, Pa. Midland, Pa.	4.30 J3, U1, C11	4.30 J3, U1	5.40 A5,C8, C11,J3, W16,B4,R3	5.075 U1,C11	6.025 A5,C11, W10,C8,R3	6.45 J3, U1	4.225 J3, U1	5.275 U1	5.80 U1	6.45 J3, U1	5.75 A5, J3, P6
	Portsmouth, Ohio											5.75 P7
	Worren, Wheeling, Follansbee, W. Va.	4.30 W3						4.225 W3, W5				
	Youngstown, Ohio	4.30 U1, Y1, C10,R3	4.30 U1, Y1, R3	5.40 F2, Y1, C10	5.075 U1, Y1, C10	6.025 Y1,C10 6.845 F2	6.45 U1, Y1	4.225 U1, Y1, R3		5.80 Y1	6.45 Y1	5.75 Y1
	Emeryville, Cal.	5.85 J5	5.85 J5									
	Fontana, Cal.	5.80 K1	5.80 K1		6.125 K1		7.70 K1	4.875 K1		6.45 K1	7.15 K1	
	Genova, Utah							4.225 C7			6.45 C7	
	Kansas City, Mo.	4.55 S2	4.55 S2		5.325 S2		6.70 S2					6.00 S2
	Los Angeles, Torrance, Cal.	5.80 B2,C7	5.80 B2,C7	6.85 R3	6.125 B2		7.15 B2					6.70 B2
	Minneapolis, Colo.	4.75 C6	4.75 C6					5.075 C6				6.00 C6
	Portland, Ore.	5.85 O2	5.85 O2									
SOUTH	San Francisco, Niles, Pittsburg, Cal.	5.80 C7,P9 5.85 B1	5.80 C7,P9 5.85 B2				7.20 B2					6.70 C7
	Seattle, Wash.	5.85 B2,P12, N6	5.85 B2,P12				7.20 B2	5.125 B2		6.70 B2	7.35 B2	
	Atlanta, Ga.	4.50 A8	4.50 A8									5.95 A8
	Fairfield, Ala. City, Birmingham, Ala.	4.30 T2,C16, R3	4.30 T2,C16, R3				6.45 T2	4.225 T2,R3			6.45 T2	5.75 R3, T2
	Houston, Ft. Worth, Lone Star, Tex.	4.55 S2	4.55 S2		5.325 S2		6.70 S2	4.55 L3 4.275 S2		5.85 S2	6.50 S2	6.00 S2

(Effective Feb. 15, 1955)

Steel Prices**Key to Steel Producers****With Principal Offices**

- A1 Acme Steel Co., Chicago
 A2 Alan Wood Steel Co., Conshohocken, Pa.
 A3 Allegheny Ludlum Steel Corp., Pittsburgh
 A4 American Cladmetals Co., Carnegie, Pa.
 A5 American Steel & Wire Div., Cleveland
 A6 Angell Nail & Chaplet Co., Cleveland
 A7 Armco Steel Corp., Middletown, O.
 A8 Atlantic Steel Co., Atlanta, Ga.
 B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
 B2 Bethlehem Pacific Coast Steel Corp., San Francisco
 B3 Bethlehem Steel Co., Bethlehem, Pa.
 B4 Blair Strip Steel Co., New Castle, Pa.
 B5 Bliss & Laughlin, Inc., Harvey, Ill.
 C1 Calstrip Steel Corp., Los Angeles
 C2 Carpenter Steel Co., Reading, Pa.
 C3 Central Iron & Steel Co., Harrisburg, Pa.
 C4 Claymont Products Dept., Claymont, Del.
 C5 Cold Metal Products Co., Youngstown, O.
 C6 Colorado Fuel & Iron Corp., Denver
 C7 Columbia Geneva Steel Div., San Francisco
 C8 Columbia Steel & Shifting Co., Pittsburgh
 C9 Continental Steel Corp., Kokomo, Ind.
 C10 Copperweld Steel Co., Pittsburgh, Pa.
 C11 Crucible Steel Co. of America, New York
 C12 Cumberland Steel Co., Cumberland, Md.
 C13 Cuyahoga Steel & Wire Co., Cleveland
 C14 Compressed Steel Shafting Co., Readville, Mass.
 C15 G. O. Carlson, Inc., Thorndale, Pa.
 C16 Connors Steel Div., Birmingham
 D1 Detroit Steel Corp., Detroit
 D2 Detroit Tube & Steel Div., Detroit
 D3 Driver Harris Co., Harrison, N. J.
 D4 Dickson Weatherproof Nail Co., Evanston, Ill.
 D5 Henry Distant & Sons, Inc., Philadelphia
 E1 Eastern Stainless Steel Corp., Baltimore
 E2 Empire Steel Co., Mansfield, O.
 F1 Firth Sterling, Inc., McKeesport, Pa.
 F2 Fitzsimmons Steel Corp., Youngstown
 F3 Follansbee Steel Corp., Follansbee, W. Va.
 G1 Globe Iron Co., Jackson, O.

- G2 Granite City Steel Co., Granite City, Ill.
 G3 Great Lakes Steel Corp., Detroit
 G4 Greer Steel Co., Dover, O.
 H1 Hanna Furnace Corp., Detroit
 I1 Ingersoll Steel Div., Chicago
 I2 Inland Steel Co., Chicago
 I4 Interlake Iron Corp., Cleveland
 J1 Jackson Iron & Steel Co., Jackson, O.
 J2 Jessop Steel Corp., Washington, Pa.
 J3 Jones & Laughlin Steel Corp., Pittsburgh
 J4 Joolyn Mfg. & Supply Co., Chicago
 J5 Judson Steel Corp., Emeryville, Calif.

- K1 Kaiser Steel Corp., Fontana, Cal.
 K2 Keystone Steel & Wire Co., Penira
 K3 Koppers Co., Granite City, Ill.
 L1 Laclede Steel Co., St. Louis
 L2 La Salle Steel Co., Chicago
 L3 Lone Star Steel Co., Dallas
 L4 Lukens Steel Co., Coatesville, Pa.

- M1 Mahoning Valley Steel Co., Niles, O.
 M2 McLouth Steel Corp., Detroit
 M3 Mercer Tube & Mfg. Co., Sharon, Pa.
 M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
 M5 Monarch Steel Div., Hammond, Ind.
 M6 Mystic Iron Works, Everett, Mass.
 N1 National Supply Co., Pittsburgh
 N2 National Tube Div., Pittsburgh
 N3 Niles Rolling Mill Div., Niles, O.
 N4 Northwestern Steel & Wire Co., Sterling, Ill.
 N5 Newport Steel Corp., Newport, Ky.
 N6 Northwest Steel Rolling Mills, Seattle
 N7 Newman Crosby Steel Co., Pawtucket, R. I.
 N8 Northeastern Steel Corp., Bridgeport, Conn.

- O1 Oliver Iron & Steel Co., Pittsburgh
 O2 Oregon Steel Mills, Portland

- P1 Page Steel & Wire Div., Monessen, Pa.
 P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh
 P6 Pittsburgh Steel Co., Pittsburgh
 P7 Portsmouth Div., Detroit Steel Corp., Detroit

- P8 Plymouth Steel Co., Detroit
 P9 Pacific States Steel Co., Niles, Cal.
 P10 Precision Drawn Steel Co., Camden, N. J.
 P11 Production Steel Strip Corp., Detroit
 P12 Pacific Steel Rolling Mills, Seattle

- R1 Reeves Steel & Mfg. Co., Dover, O.
 R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
 R3 Republic Steel Corp., Cleveland
 R4 Roebling Sons Co., John A., Trenton, N. J.
 R5 Rotary Electric Steel Co., Detroit
 R6 Rodney Metals, Inc., New Bedford, Mass.
 R7 Rome Strip Steel Co., Rome, N. Y.

- S1 Sharon Steel Corp., Sharon, Pa.
 S2 Sheffield Steel Corp., Kansas City
 S3 Shenango Furnace Co., Pittsburgh
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.
 S5 Sweet's Steel Co., Williamsport, Pa.
 S6 Standard Forging Co., Chicago
 S8 Superior Drawn Steel Co., Monaca, Pa.
 S9 Superior Steel Corp., Carnegie, Pa.

- T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
 T2 Tennessee Coal & Iron Div., Fairfield
 T3 Tennessee Products & Chem. Corp., Nashville
 T4 Thomas Strip Div., Warren, O.
 T5 Timken Steel & Tube Div., Canton, O.
 T6 Tremont Nail Co., Warcham, Mass.
 T7 Texas Steel Co., Fort Worth

- U1 United States Steel Corp., Pittsburgh
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
 U3 Ulbrich Stainless Steels, Wallingford, Conn.
 U4 U. S. Pipe & Foundry Co., Birmingham

- W1 Wallingford Steel Co., Wallingford, Conn.
 W2 Washington Steel Corp., Washington, Pa.
 W3 Weirton Steel Co., Weirton, W. Va.
 W4 Wheatland Tube Co., Wheatland, Pa.
 W5 Wheeling Steel Corp., Wheeling, W. Va.
 W6 Wickwire Spencer Steel Div., Buffalo
 W7 Wilson Steel & Wire Co., Chicago
 W8 Wisconsin Steel Co., S. Chicago, Ill.
 W9 Woodward Iron Co., Woodward, Ala.
 W10 Wyckoff Steel Co., Pittsburgh
 W11 Worcester Pressed Steel Co., Worcester, Mass.
 Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (per) 1.0-h. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS										
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.		
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	
STANDARD T. & C.																							
Sparrows Pt. B3	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0									
Youngstown R3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0									
Fontana K1	10.75	W4.5	13.75	W0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0									
Pittsburgh J3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75	
Alton, Ill. L1	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0									
Sharon M3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0									
Fairless N2	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0									
Pittsburgh M1	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75	
Wheeling W5	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0									
Wheatland W4	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0									
Youngstown Y1	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75	
Indiana Harbor Y1	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75	
Lorain N2	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75	
EXTRA STRONG PLAIN ENDS																							
Sparrows Pt. B3	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0									
Youngstown R3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0									
Fairless N2	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0									
Fontana K1	14.25	18.25	18.25	18.25	18.25	18.25	19.75	19.75	19.75	20.75	20.75	21.75	21.75	22.25	22.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75
Pittsburgh J3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75	
Alton, Ill. L1	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0									
Sharon M3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75	
Pittsburgh M1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75	
Wheeling W5	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0									
Wheatland W4	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0									
Youngstown Y1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75	
Indiana Harbor Y1	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0									
Lorain N2	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75	26.5	10.75	

Threads only, butt-weld and seamless 2 1/4 pt. higher discount. Plain ends, butt-weld and seamless, 3-in. and under, 4 1/2 pt. higher discount. Butt-weld jobs discount, 5 pt. Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/4, 3/8 and 1-in., 5 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Feb. 15, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F. & B. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer U.I.	4.45	5.25	5.425				
So. Chicago R.R.				7.30			
Eastley T2	4.45	5.25					
Fairfield T2		5.25		7.30		5.275	
Gary U.I.	4.45	5.25				5.275	
Ind. Harbor J3	4.45		5.425	7.30		5.275	
Johnstown B3		5.25					
Juliet U.I.		5.25	5.425				
Kansas City S2				7.30			11.50
Lackawanna R3	4.45	5.25	5.425			5.275	
Minneapolis C6	4.45	5.25	5.425	7.30		5.275	11.50
Pittsburgh O1						11.00	11.50
Pittsburgh P5							
Pittsburgh J3				7.30			
Seattle B2				7.00		5.425	12.00
Steelton B3	4.45		5.425			5.275	
Struthers Y1				7.30			
Torrance C7						5.425	
Williamport S5		5.25					
Youngstown R3				7.30			

ELECTRICAL SHEETS

22-Gage F. & B. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 60	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G7); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U); Warren, O. (R3); Zanesville (A7).
*Cuts 7 1/2" higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Costsville, Pa., L4	35.50	
Washington, Pa., J2		
Claymont, Del., C4		
New Castle, Ind., I2		32.50
Nickel-carbon		
10 pct. Costsville, Pa., L4	39.50	
Inconel-carbon		
10 pct. Costsville, Pa., L4	47.90	
Monel-carbon		
10 pct. Costsville, Pa., L4	40.00	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F. & B. Mill	Standard & Coated Nails	Woven Wire Fence 9-12 1/2 ga.	1/2" Fence Posts	Single Loop Bolo Ties	Galv. Barbed and Twisted Barbed Wire	Mesh Wire Ann'd	Mesh Wire* Galv.
Albama City R3	127	146		155	159	6.90	7.30
Albama City R3	127	146		155	159	6.90	7.30
Atlanta A5	139	151		157	164	7.00	7.35
Bartonsville K2	139	151		157	164	7.00	7.35
Buffalo W6						6.90	7.30
Chicago, Ill. N4	137	149		155	162	6.90	7.45
Cleveland A6	142						
Cleveland A5						6.90	
Crawfordsville M4	139	151		157	159	7.00	7.35
Donora, Pa. A5	137	146		155	159	6.90	7.30
Duluth A5	137	146	150	155	159	6.90	7.30
Fairfield, Ala. T2	137	146		155	159	6.90	7.30
Galveston D4	139						
Houston S2	142	154		164	7.30	7.70	
Johnstown, Pa. B3	137	149		155	162	6.90	7.45
Juliet, Ill. A5	137	146		155	159	6.90	7.30
Kokomo, Ind. C9	139	149		157	161	7.00	7.35
Kansas City S2	142	155		167	164	7.50	7.90
Minneapolis C6	142	151	155	160	164	7.15	7.55
Monessen P6	137	151		163	6.90	7.45	
Moline, Ill. R3		145					
Pittsburgh, Cal. C7	156	160		179	179	7.85	8.25
Portsmouth P7						6.90	7.90
Rankin, Pa. A5	137	146		155	159	6.90	7.30
Se. Chicago R3	137	146	145	155	159	6.90	7.30
S. San Francisco C6				179			
Sparrows Pt. B3	139			157	164	7.00	7.55
Struthers, O. Y1						6.90	7.55
Warren, O. A5	143					7.20	
Williamport, Pa. S5		150					

Cut Nails, carloads, base \$3.30 per bag at Conshohocken, Pa. (A7).

* Alabama City and Se. Chicago don't include zinc extra.

Galvanized products computed with zinc at 11.5¢ per lb.

WARE-HOUSES

Cities	City Delivery Charge	Base price, f.o.b., dollars per 100 lb.									
		Sheets		Strip		Plates Shapes		Bars		Alloy Bars	
		Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold-Finished	As rolled A 4415 As rolled	Cold-Drawn A 4415 As rolled
Baltimore	\$.20	6.22	7.51	7.78	6.80	6.57	6.92	6.68	8.52		
Birmingham	.15	6.35	7.35	8.25	6.00	6.65	6.65	6.50	9.00		
Beacon	.10	7.23	8.23	9.42	6.47	7.34	7.49	7.29	8.60	12.60	15.15
Buffalo	.20	6.35	7.49	8.80	6.70	6.65	6.70	6.50	12.50	12.30	14.85
Chicago	.20	6.38	7.38	8.30	6.62	6.70	6.77	6.55	7.90	12.25	14.60
Cincinnati	.15	6.49	7.37	8.25	6.06	6.81	6.91	6.75	7.90	12.55	14.90
Cleveland	.20	6.53	7.42	8.30	6.91	6.66	6.80	6.75	7.85	11.96	14.76
Danver		6.15	9.15	10.37	8.40	6.10	6.15	6.30	9.27		16.30
Detroit	.20	6.57	7.57	8.50	6.90	6.80	7.16	6.79	7.77	12.45	14.80
Houston	.20	7.35	7.80	9.93	7.70	7.35	7.60	7.70	9.50	13.10	
Kansas City	.20	7.05	8.95	9.95	7.29	7.19	7.36	7.16	8.07	12.27	
Los Angeles	.20	7.50	9.35	9.95	7.85	7.45	7.65	7.45	10.15	13.35	16.50
Memphis	.10	6.79	7.69		6.90	7.01	7.09	6.88	8.24		
Milwaukee	.20	6.47	7.47	8.21	6.71	6.61	6.88	6.60	7.60	12.34	14.60
New Orleans	.15	6.70	7.65	9.23	6.90	6.90	7.05	6.90	8.70	10.70	
New York	.10	6.97	7.79	8.79	7.30	7.10	7.13	7.30	8.60	12.63	15.08
Norfolk	.20	6.96	8.46	8.99	7.54	7.27	7.38	7.37	8.70		
Philadelphia	.10	6.19	7.29	8.09	6.96	6.60	6.54	6.74	8.19	11.66	14.86
Pittsburgh	.20	6.38	7.38	8.30	6.72	6.52	6.60	6.51	7.85	12.25	14.60
Portland	.20	7.00	8.75	9.65	7.65	7.45	7.50	7.55	10.95		
Salt Lake City	.20	7.65	10.20	10.70	9.00	7.70	7.70	8.60	10.95		
San Francisco	.20	7.55	8.95	9.35	7.00	7.40	7.50	7.35	10.05	13.35	16.50
Seattle	.00	8.10	9.90	10.15	8.20	7.90	7.75	7.60	10.95	13.80	16.45
St. Louis	.20	6.62	7.67	8.54	6.91	6.91	7.09	6.80	7.89	12.54	14.84
St. Paul	.15	6.67	8.03	8.94	7.28	7.19	7.35	7.16	8.26	12.54	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions: (1) 1000 to 9999 lb. (2) 1000 lb or over. (3) \$3.50 delivery. (4) 1000 to 1999 lb, \$3.25 delivery.

C-R SPRING STEEL

Cents Per Lb F. & B. Mill	CARBON CONTENT				
	0.20-0.40	0.41-0.60	0.61-0.80	0.81-1.00	1.00-1.35
Bridgeport, New					
Britain, Conn. N8	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. R7	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. S9	5.75	8.05	9.00	11.15	13.85
Cleveland A5	5.75	8.05	9.00	11.15	13.85
Detroit D1	5.85	8.25	9.20	10.95	
Detroit D2	5.85	8.25	9.20		
Harrison, N. J. C11			9.30	11.45	14.10
Indianapolis C5	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. B4	5.75	8.05	9.00	10.95	
New Haven, Conn. D1	6.20	8.35	9.30	11.25	
Pawtucket, R. I. N7	6.30	8.35	9.30	11.45	14.15
Riverside, Ill. A1	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. S1	5.75	8.05	9.00	11.15	13.85
Trenton R4		8.35	9.30	11.25	13.85
Wallingford W1	6.20	8.35	9.30	11.45	14.10
Warren, Ohio T4	5.75	8.05	9.00	11.15	13.85
Watson, W. Va. W3	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. A5	6.60	8.35	9.30	11.45	14.10
Youngstown C5	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F. & B. Mill	Size					
	OD-In.	B.W.Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.46	32.95
	2 1/2	12	38.15	45.74	37.00	44.38
	3	12	44.95	52.82	42.72	51.23
	3 1/2	11	51.43	61.66	49.80	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.46	
	2 1/2	12	38.15	45.74	37.00	
	3	12	44.95	52.82	42.72	
	3 1/2	11	51.43	61.66	49.80	
	4	10	68.29	81.88	66.24	
Pittsburgh Steel	2	13	28.33	33.97		
	2 1/2	12	38.15	45.74		
	3	12	44.95	52.82		
	3 1/2	11	51.43	61.66		
	4	10	68.29	81.88		

Miscellaneous Prices

(Effective Feb. 15, 1955)

TOOL STEEL

F.o.b. mill					
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	\$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29
High-carbon chromium					
Oil hardened manganese					
Special carbon					
Extra carbon					
Regular carbon					
Warehouse prices on and east of Mississippi are 2.5¢ per lb higher. West of Mississippi, 5.5¢ higher.					

CAST IRON WATER PIPE

Per Net Ton	
6 to 24-in., del'd Chicago	\$111.80 to \$115.30
6 to 24 in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	95.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$129.50 to \$131.50
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

Gross Ton	
Openhearth lump	\$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Meabi, bessemer	10.05
Meabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

Net-Ton	
Furnace, beehive (f.o.b. oven)	\$14.25 to \$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.50 to \$17.00
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	22.00
Swedeland, Pa., f.o.b.	22.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	20.80	40	100, 110	8.95
20	72	20.00	36	110	8.95
12 to 18	72	20.80	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
8	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.30
2 1/2	30	28.00	10, 12	60	10.30
2	24	43.00	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount	
	Less Case	C.
1/2 in. & smaller x 4 in. & shorter	2	22
1/2 in. & smaller x 6 in. & shorter	+2	18
9/16 in. & 5/8 in. x 6 in. & shorter	+4	17
3/4 in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in. & shorter	+15	8
1/2 in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in. & shorter	+3	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Discount, Base Case or Keg	
	Base Case or Keg	Discount
3/4" or smaller	55	64
3/4" to 1 1/4" inclusive	55	66
1 1/4" to 1 3/4" inclusive	60	67 1/2

C.P. Hex regular & hvy.

All sizes	55	64
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Hot Galv. Nuts (all types)

3/4" or smaller	38	50
3/4" to 1 1/4" inclusive	41	52 1/2

Finished, Semi-finished, Slotted or Case-fellated Nuts

All sizes	55	66
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Rivets

	Base per 100 lb	
	Base	Pct Off List
1/2 in. & larger	\$9.25	87
7/16 in. and smaller		87

Cap Screws

	Discount	
	Bright	H.C. Heat Treated
New std. hex head, packaged		
1/2" x 6" and smaller and shorter	38	28
3/4", 1" x 6" and shorter	15	1
New std. hex head, bulk		
5" x 6" and smaller and shorter	50	42
3/4", 1" x 6" and shorter	32	21
* Minimum quantity per item:		
15,000 pieces 1/4", 5/16", 3/8" diam.		
5,000 pieces 7/16", 1/2", 9/16", 5/8" diam.		
2,000 pieces 3/4", 1", 1 1/4" diam.		

Machine Screws & Stove Bolts

	Discount	
	Mach. Screws	Stove Bolts
Packaged, package list	33	43
Bulk, bulk list		
1/4-in. Quantity		
15,000-99,999	59	17
100,000-199,999	43	25
200,000 & over	67	33
5/16-in. Quantity		
15,000-49,999	59	17
50,000-99,999	43	25
100,000 & over	67	33
diam. & Quantity		
15,000-49,999	59	
50,000-99,999	43	
100,000 & over	67	

Machine Screw & Stove Bolt Nuts

	Discount	
	Hex	Square
Packaged, package list	30	33
Bulk, bulk list		
1/4-in. Quantity		
15,000-99,999	15	17
100,000-199,999	23	25
200,000 & over	31	33

REFRACTORIES

Fire Clay Brick

Carloads per 1000	
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	
California	
Super Duty	
Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	

Chrome Brick

Per net ton	
Standard chemically bonded, Balt.	\$56.00
Standards chemically bonded, Curtner, Calif.	86.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	\$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. % - in. grains	
Domestic, f.o.b. Baltimore in bulk fines removed	\$64.40
Domestic, f.o.b. Chewah, Wash., Lunenburg, Nev.	
In bulk	35.00
In sacks	43.75

Dead Burned Dolomite

Per net ton	
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	\$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill. Price, net ton; effective CaF ₂ content	
75% %	\$44.00
70% or more	42.50
60% or less	35.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.	
Swedish sponge iron c.l.f.	11.35¢
New York, ocean bags	
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship, pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 98.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe, 63.0¢ to 80.0¢	
Carbonyl iron, size 5 to 10 micron, 98%, 60.5+% Fe	\$2.0¢ to \$1.45
Aluminum	31.5¢
Brass, 10 ton lots	\$9.50¢ to \$8.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb. 98¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd.	\$9.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	42.75¢
Nickel, unannealed	89.50¢
Nickel, annealed	92.50¢
Nickel, spherical, unannealed	43.50¢
Silicon	
Solder powder, 7.5¢ to 9.5¢ plus met. value	
Stainless steel, 202	91.0¢
Stainless steel, 316	\$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	\$4.05
Zinc, 10 ton lots	17.5¢ to 35.0¢

Ferroalloy Prices

(Effective Feb. 15, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max C

0.025% C	36.00	0.15% C	33.75
0.025% C		0.20% C	33.50
Simplex	34.50	0.50% C	33.25
0.06% C	34.50	1.00% C	33.00
0.10% C	34.00	2.00% C	32.75
65-69% Cr, 4-9% C			24.75
62-66 Cr, 4-6% C, 6.9% Si			25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	25.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C	\$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.	19.00
Carloads	22.10
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.	20.00
Carloads	22.30
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 6-7% Zr, 20% Fe 1/2 in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. Si 10%, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. Si 10%, Ti 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn; Cents per-lb

Producing Point

Marietta, Ashland, O.; alloy,	
W. Va.; Sheffield, Ala.; Portland,	
Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese Silicon	
16 to 19%	3¢ max. \$84.00
19 to 21%	3¢ max. 86.00
21 to 23%	3¢ max. 88.50
23 to 25%	3¢ max. 91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn

	21.35¢
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Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

Carloads	Ton	Less	
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$85.00 gross ton, freight allowed to normal trade area.

Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$88.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots	2.40	3.30	4.55

Ferrovandium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	\$3.00-\$3.10
Crucible	3.10-3.20
High speed steel (Primors)	3.20-3.25

Alaifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo

	\$1.28
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Ferrocolumbium, 50-60%, 2 in.

x D contract basis, delivered per pound contained Cb.

Ton lots	\$12.00
Less ton lots	12.05

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.

	\$6.25
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Ferromolybdenum, 55-75%, 200-lb

containers, f.o.b. Langeloth, Pa., per pound contained Mo.

	\$1.46
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Ferrophosphorus, electric, 23-

26% car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.90 unitage, per gross ton

	\$90.00
10 tons to less carload	\$110.00

Ferrotitanium, 40% regular grade,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.35
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Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.50
Less ton lots	\$1.55

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton

	\$177.00
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Ferrotungsten, 1/2 x down,

packed, per pound contained W, ton lots, f.o.b.

	\$3.80
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Molybdc oxide, briquets, per lb

contained Mo, f.o.b. Langeloth, Pa.

	\$1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa.	\$1.24

Simanal, 20% Si, 20% Mn, 20%

Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed, lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89%

V₂O₅ contract basis, per pound contained V₂O₅

	\$128
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Zirconium, contract basis, per lb

of alloy.

25-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 314%, Si, 40-45%, per lb contained 2...

	\$5.25
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Bortam, f.o.b. Niagara Falls

Ton lots, per pound

	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%,

Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢
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Ferroboreon, 17.50% min. B, 1.50%

max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.

F.o.b. Wash. Pa.; 100 lb up	85
10 to 14% B	1.20
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa.,

freight allowed, 100 lb and over.

No. 1	\$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn,

15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	\$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00%

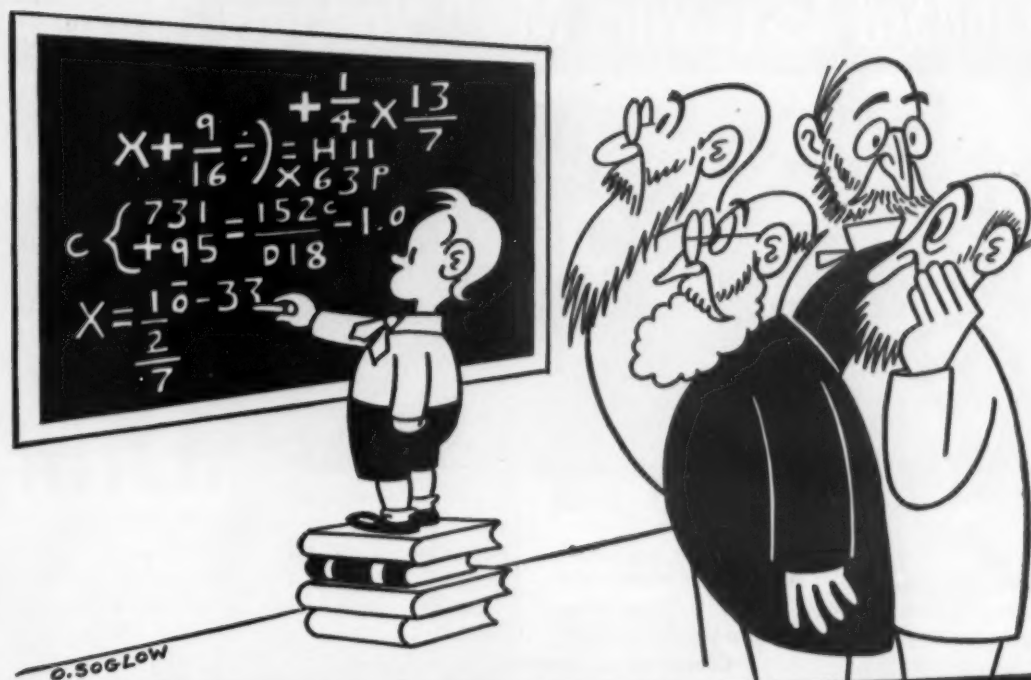
max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots

	\$2.05
--	--------

Silenz, contract basis, delivered.

Ton lots

	45.00¢
--	--------



You'll be surprised at these figures!

Thanks to the thrift of employed Americans and the cooperation of 45,000 companies which have enrolled more than 8,000,000 men and women in the Payroll Savings Plan—

- Sales of E and H Bonds (H Bond is the current-income companion piece of the E Bond, sold only to individuals and purchased in larger denominations by executives) in 1954 totaled \$4.9 billion, a new peacetime record.
- Sales in 1954 exceeded *all redemptions* in that year of matured E Bonds and unmatured E and H Bonds by more than \$400 million—the highest net amount since 1949.

- Cash value of E and H Bonds outstanding reached a new record high of \$38.2 billion, a gain of \$1.5 billion in 1954.

- This \$38.2 billion cash holding by individuals represents 14% of the national debt. Never before has the national debt of our country been so widely held.

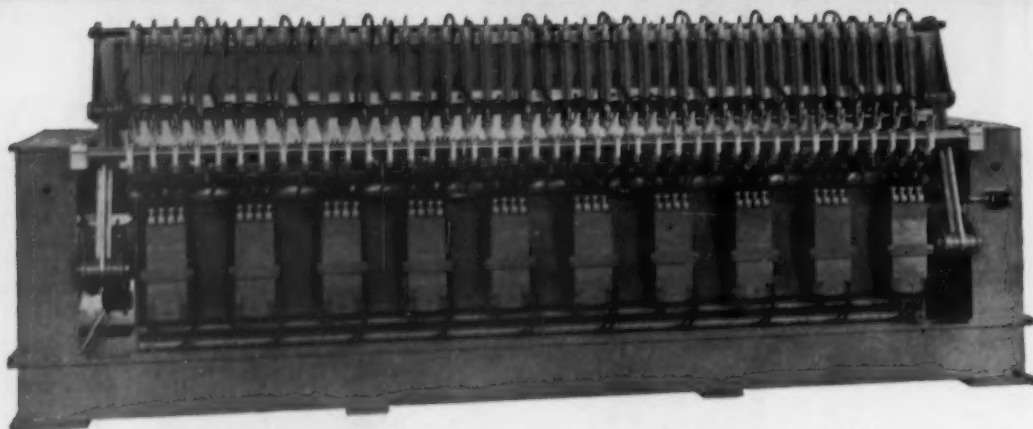
These figures, far more effectively than mere words, tell the story of The Payroll Savings Plan—why it is good for America, why it is good for business. If you do not have the Plan, or if you have the Plan and your employee percentage is less than 50%, phone, wire or write to Savings Bond Division, U. S. Treasury Department, Washington, D. C.

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Sixty Cross Wires per minute . . . 2" Min. to 12" Max. Spacings . . . Easily Adjusted Cross Wire and Longitudinal Wire Spacing . . . Hand-Started Pattern not required to start New Mesh Pattern . . . Cross Wire may be Pre-Straightened and Hand-Loaded or Auto-

matically loaded with Cross Wire Feed Accessory . . . **Accessories Available:** Cross Wire Feed, Take-up Mandrel, Longitudinal Wire Straightener . . . (Three Handwheels Adjust All Longitudinal Wire Straightener Rolls in Unison.)

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The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

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10 TONS OF HOT STEEL

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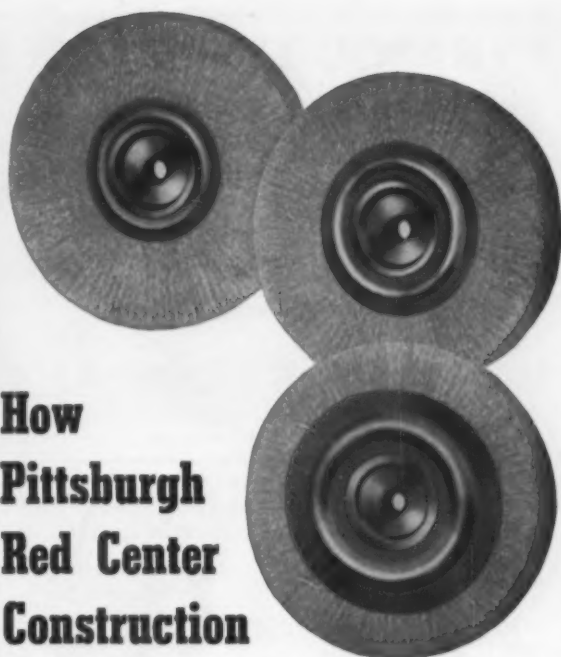


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February 17, 1955

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Capacity 1 1/4" X 12'



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Light and heavy machinery for all classes of sheet metal, plate and structural work.

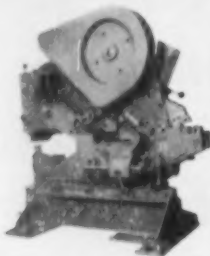
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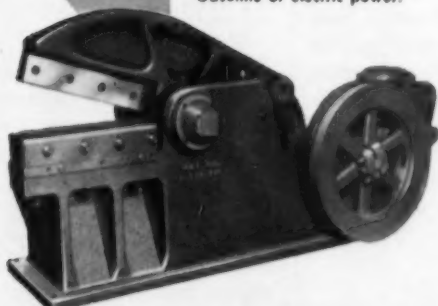
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Requires no shimming after knives have been ground.

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King pin, crank-shaft and pinion shaft completely bronze bushed.

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HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Growing Canadian Market . . .

The fast-expanding metalworking industry in Canada is creating a solid new market for used and rebuilt machinery dealers in neighboring states.

Larger dealers in Detroit have found encouraging sales results when they have dispatched salesmen across the border. The market is general and it would be difficult to pinpoint any particular type of equipment that is in greatest demand. Toolroom, production, and special tools all have potential markets.

Need New, Used Tools . . .

The expanding nature of Canada's metalworking makes it an ideal market for new and rebuilt equipment. Some plants are starting up on limited capital and need the lower prices to get equipped. Some manufacturers need equipment immediately for specific jobs and can get better delivery from inventories in used and rebuilt sources.

The fact that this column stems from Detroit sources does not mean that the market is only across the Detroit river from local dealers. Actually, the market is north, both east and west, in addition to the general industrial area adjacent to Detroit.

Equipment Guaranteed . . .

In the Detroit area specifically, the market is steady to improved, but dealers must be ready to be competitive in price, quality and service. Most customers today demand and get guarantees on used equipment. This varies from company to company and there is no rule of thumb. A 30-day, money-back - if - dissatisfied guarantee might be considered well in line.

Toolroom and high production equipment are in greatest demand. Price is competitive and a buyer can expect to pay about 60 pct of

new price for a 10 to 12-year-old machine tool. One dealer confided that the only type of equipment that would bring a higher than new price would be a Bridgeport mill.

Feeling Optimistic . . . In general, the trade in Detroit is encouraged by the first-of-the-year upturn in the market. However, it is difficult to nail down causes other than an optimistic business tone.

As reported here previously, many small and moderate sized shops find it necessary to have modern equipment to keep costs competitive. This leads to a good demand, but from highly discriminating customers. They aren't looking for equipment that can just do a specific job, but it must be able to do it at a cost and with quality to keep it competitive.

Good Press Market . . .

This is particularly true among independent stampers who constitute a strong market for good condition presses that can modernize plants. Stamping has been a very competitive business here and only those with modern and efficient equipment are able to bid competitively.

As a result of this trend to modernization, many dealers have been caught with their inventories long on old stuff. Many are unloading at a loss or even junking old equipment rather than trying to put it on the market and perhaps result in losing a sale of a newer machine or tool.

Prices now are 10-15 pct under a year ago, according to one of the big dealers, and production equipment is as much as 50 pct down. Another firm reports, "Real good stuff is in short supply—lathes, milling machines, horizontal boring machines—and prices are rather firm."

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

8" x 1/2" Bertish Initial Type Bending Roll—LATE
12" x 1/2" Bertish Initial Type Bending Roll
18" x 1/2" Bertish Initial Type Bending Roll
24" x 1" Hillier & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE

8" x 1/2" Drets & Krump Size 180
12" x 1/2" Drets & Krump Size 200
18" x 1/2" Drets & Krump, Motor Driven

BRAKES—PRESS TYPE

Model B-178 Verson All Steel, Capacity 12"x1/2"
Cincinnati All Steel Press Brake 10"x1/2"

CRANES—OVERHEAD ELECTRIC

TRAVELING

8 ton P&H Trav-Lift	20' Span 220/440 A.C.
8 ton P&H Trav-Lift	20' Span 440 Volt A.C.
8 ton P&H	20' Span 220/3/60 A.C.
7 1/2 ton Shopard-Niles	23' Span 220/3/60 A.C.
15 ton Shopard-Niles	45' Span 220 Volt D.C.
16 ton Harnischfeger	50' Span 220/3/60 A.C.
15 ton OBT	45' Span 220/3/60 A.C.
15 ton Case	80' Span 220 Volt D.C.
15 ton P&H	97' Span 115 Volt D.C.
With 220/440 AC Generator Set	
80 ton Whiting	60' Span 220 Volt D.C.
80 ton Niles	60' Span 220/3/60 A.C.
125 ton Cleveland	65' Span 220 Volt D.C.

With 2 Trolleys 62 1/2 ton & 10 ton Aux.

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Traylor Wilcox Cut-off Machine, Capacity 2 1/2" to 6 1/2" Complete with Hydr. System & Elec. Equip.

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25,000 McKay Chain Draw Bench, 41' Length of Draw
150,000 Poodle Draw Bench, Max. length of bar 80'
With draw up to 4 1/2" max. round

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1" 1 1/2" Acme
8" AJAX with Air Clutch
1" 1 1/2", 2", 3", 3 1/2", 4", 5" Ajax
1 1/2" 4", 5" National
7 1/2" National—Air Clutch

FURNACE—ANNEALING

Lee Wilcox Annealing Furnace — Natural Gas
Work Dimensions 43" Coil, 96" Piling Height

FURNACE—HEATING

Rockwell Rotary Hearth Gas Fired Forge Furnace

FURNACES—MELTING

2 ton Whiting Hydro Arr. Top Charge
10 ton Herault, Side Charge, with Transformer
10 ton Elec. Furnace Co. Air Melting Furnace

HAMMERS — BOARD DROP — STEAM DROP — STEAM FORGING—800 lb. to 20,000 lb.

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54" Actna Standard 17 Rolls 4 1/2" Dia.
72" E & J 8 Rolls 4 1/2" Dia.
72" Sutton, 23 Rolls 3 1/2" Dia.
72" Voss-Ungerer, 23 Work Rolls 2.165" Dia. Capacity 22 to 12 Gauge Mild Steel

MULTISLIDE MACHINE

220 U 2 Multislide Max. width of stock 4 1/2" by .080 thick. Edgewise Stock Straightener

PLATE DUPLICATOR

Thomas Machine Mfg. Co. Plate Duplicator, Handlow
Plates 6" x 16". Punch Capacity 6" Hole through 1/4" Plate

PRESSES—HYDRAULIC

100 ton Southward 4-Column, 14" Stroke Platen 18" x 24"
800 ton Wood 4 Columns, 24" Stroke, 72" x 96"
Between Columns
1200 ton Birdboro 4-Columns, 26" Stroke 20" x 36"
Between Columns

PRESS—STRAIGHT SIDE

100C Ajax 1000 ton Forging Press, Motor Drive

PRESSES—TRIMMING

No. 74 1/2 Bliss 90 ton, 4" Stroke, 16 1/2" Shut Height
No. 75 1/2 Bliss 110 ton, 4" Stroke, 18" Shut Height
No. 87 Toledo 150 ton, Bed Area 44" x 37"

PUNCH & SHEAR COMBINATIONS

No. 20 Pola Ironworker, Capacity Punch 1-3/16"x1",
Shear 2" 80, 2 1/2" 80, Angles today
23 Long & Allstatter Double End, Punch 1" x 1"
25 Wickes Single End 42" Throat 1 1/2" x 1"
Style W Cleveland Single End, 60" Throat, 315 Ton
With Attachment for Dishling Heads

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Terrington Tendon Flattening Mill with Edge
Conditioning Rolls, Flattening Rolls 8" x 4"
7 1/2" Stacker Four High Rolling Mill
1" x 1 1/2" Blake & Johnson Single Stand Two High
18" x 14" United Three Stand Two High
12" x 16" Waterbury Farrel Tumbler Mill
18" x 18" Philadelphia 2-High Cold Rolling Mill

18" x 20" Lewis Two High Two Stand
20" x 28" Poodle Two Stand Two High
28" Meats 2-High Reversing Blooming Mill

SHEARS—GATE

30" x 1/2" Birdboro
18" x 1" Garrison

SHEARS—ANGLE

48x1 1/2" Hillier & Jones
48x1 1/2" Long & Allstatter Size B
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SHEARS—BILLET

No. 8 Buffalo Billet Shear, Motor Driven, Capacity
2 1/2" Sq., 2-18/16" Rd., 3 1/2" Flat

SHEARS—ROTARY

3/16" Quickwork Rotary Shear, 36" Throat
1/4" Kling #200, With Flanging Attachment
1/2" Quickwork Circle Shear 18" Throat, Circle Cutting Attachment

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18" x 3/16" Niagara 78D, Motor Dr. NEW 1951
18" x 3/16" Drets & Krump, Motor Driven
72" x 18 Ga. Niagara #46-B
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120" x 1/2" Niagara #510
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80" Yoder Coil Slitting Line, Uncoiler & Reelster
35" Paxon Coil & Sheet Slitter
72" Yoder Sheet Slitter

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No. 9 Medart Continuous Automatic Straightening
Machine, Capacity 1/2" to 1 1/2" Dia. Bars any
length or up to 3" Tubing, Motor Driven
Knox & Bunch 3-Roll Straightener, Capacity 1/2" to
1 1/2" Bolted Motor Drive
No. 2 Taylor Wilson Straightening Rolling & Burnish-
ing Machine, Capacity 1/2" to 1 1/2" Tubing
24" Hallden Automatic Strip Straightener & Cutting
Machine
48" Cleveland Punch & Shear Works Strip Straight-
ener & Cut-off Machine

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5,000 lb. Olsen Hydraulic LeCap Universal
2,000 lb. Biele Model P8-5 Universal
50,000 lb. Baldwin Southward Comp. Testing Machine
150,000 lb. Tinius Olsen Universal 4-Screw
180,000 lb. Tinius Olsen Universal 8-Screw
280,000 lb. Tinius Olsen Chain Testing Machine

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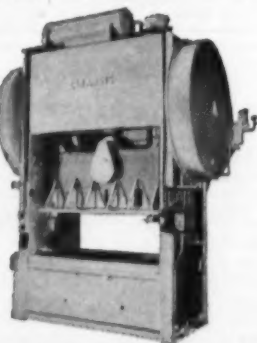
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D & K Press Brake, Capacity 7/16" x 8", 8 1/2"
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throat.

Hillier and Jones and Buffalo Bar Shears, 1 1/2",
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2-A Williams White hydraulic tube bender,
capacity 2".

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24" beams.

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10 Furnaces, Heat Treating—Lindberg, Leeds
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Forging Hammer.

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Williams White Bulldozers, #22, #23, #24, #25,
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Ajax Forging Rolls, from #1 to #4.

Ajax & National Upsetters, Suspended Slides,
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Upsetting and Forging Machines. Not Sus-
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300-Ton Oilgear High Speed Hydraulic Press,
2-Column, ram 27" x 23".

600-Ton Verson Knuckle Joint Coining Press.

Landis Landmaco Threading machines with lead
screws four spindle 1 1/2", two spindle 7/8",
two spindle 1".

Multiple Punch, Size G, L & A, 940 Ton.

Multiple Punch, Size C, L & A, 350 Ton.

Single and Double End Punches, various ca-
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MACHINES, YAPPERS, COLD BOLT TRIM-
MERS, SLOTTERS, HOT HEADERS AND TRIM-
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3 1/2" No. 32 Lucas horiz. table type.
36" & 42" Bullard vertical turret lathes.
No. 2 P & W Jig Bore Model 1278.
No. 2 Pratt & Whitney Jig Borer.
3" Bar Yoder, table type, 1942.

DRILLING MACHINES

4' arm 13" col. Carlton radial, P.F., P.E.
9' arm 16" col. American radial, H.D.

GRINDING MACHINES

8" x 15" No. 5 Brown & Sharpe Hyd. Surf. 1941.
40" No. 16A2 Blanchard 2-spd. rotary, new 1940.
72" Hanchett 3-spd. rotary surface, new 1946.
16" x 50" Landis gap type cylindrical, new 1941.

LATHES

No. 5 Jones & Lamson ram type univ. turret (2) late.
14" x 6" Hendon Toolroom, 1940.
15" 30" Lipe Carbo-Matic, 1942.
24" x 48" Monarch Toolroom, 1942.

MILLS

1-12 & 2-16 Cincinnati production.
1-2-3-4-5-6 knee type plain & vertical.
No. 30 Brown & Sharpe, pl. horiz., 1942.
24" x 24" x 12" Ingersoll adj. rail planer type, 1940.
42" x 42" x 18" Ingersoll adj. planer type.
60" x 48" x 14" Ingersoll adj. rail planer type.
No. 30 Brown & Sharpe, pl. horiz., 1942.

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12 1/2" Drets & Krump bending brake.
105 ton No. 7 1/2" Verson GBI (2) 1930.
100 ton No. 95C Toledo S.S., D.C., cushions.
180 ton 794G Verson Gap Frame.
150 ton No. 18-1 Cleveland GBI, late type.
300 ton No. 1038 Hamilton D.C., adj. bed 60" x 102".
400 ton No. 683 Toledo K-J coining or embossing.
500 ton Baldwin Southward HVSPEED Hyd., '39.
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32" G & E Invalicible, F.M.D., late type.

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5" Ajax, suspended slides, steel frame.
1 1/2" Natl. susp. slides, auto-lub. guided ram.

1000 Tools in Stock

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1—18" BAR MILL, 3-high, single stand.
1—34" x 22" x 100" PLATE MILL, 3-high, with tilting tables.
1—4-HIGH HOT STRIP MILL STANDS for up to 78" width.
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1—13" x 14" COLD STRIP MILL, 2-high.
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2—PACK FURNACES for hot sheet mills, 62" x 60", double chamber.
1—STRAIGHTENER for pipe up to 8".
1—STRAIGHTENER for bars from 1 1/2" to 3 1/2" dia.
1—STRAIGHTENER for bars from 1 1/4" to 1 1/2" dia.
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1—1800 HP GEAR DRIVE, ratio 19 to 1.
1—1500 HP GEAR DRIVE, ratio 7.55 to 1.
1—1200 HP GEAR DRIVE, ratio 900 to 30 RPM.

1—44" ROLL LATHE, enclosed headstock, tailstock, piano rest, 20 H.P., 500/1500 RPM, 230 volts, D.C. motor and control.
1—34" x 192" ROLL GRINDER with all necessary motors and controls.
1—100,000 LB. DRAWBENCH for rods and tubes, 40 ft. draw.
1—50,000 LB. AETNA-STANDARD DRAWBENCH with 150 H.P. D.C. variable speed motor drive, motor-generator set.
1—76" BACKED-UP ROLLER LEVELLER.
1—48" BACKED-UP ROLLER LEVELLER, rolls 2 1/2" dia., 30 H.P. drive.
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1—50-TON CRANE, 52'9" span, 10-ton auxiliary, 4 motors.
1—BILLETER size C for conditioning steel.
4—TINNING UNITS for hot dipped tin plate.
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1—2000 HP MOTOR, 600 RPM, 6600/3/60.
1—1250 HP MOTOR, 593 RPM, 6600/3/60.
1—750 HP MOTOR, 180/450 RPM, 400 volts D.C.

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No. 368M Gould & Eberhardt Spur Gear Cutter
Gleason Spiral Bevel Gear Rougher, m.d.
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Table 36" x 55"—IN STOCK

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48 Spindle Speeds 10 to 1000 RPM.
20 HP. A.C. Motor Drive. New in 1943.
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65 ton Whitcomb Diesel Electric Locomotive. Standard gage—Very Attractive Price.

10 ton Whitcomb Diesel Locomotive, 36" gage.

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5 Ton Toledo Bridge Crane. 60' span, 230 Volts DC. Very Attractive Price. In stock.

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230 VOLTS DC-STOCK

Qn.	HP	Make	Type	Speed
1	150	GE	MDP418	465/1400 (500V Arm)
2	80	West.	MCB-80	480
1	70	West.	MC-70	475
2	60	Shaw	Z-BME	465
3	57	West.	KI-9	480
2	42	West.	K-8	450
1	30	West.	MC-40	470
3	25	West.	48A	485
1	20	West.	K-6	515
1	18	Shaw	Z-HIF	520
1	7 1/2	West.	K-3	585
5	4 1/2	West.	K-2	600

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RE-NU-BILT GUARANTEED ELECTRIC POWER EQUIPMENT A. C. MOTORS

3 phase—60 cycle

Qn.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-488	2300	360
1	1200	ARIS		2300	720
1	1200	G.E.	MT	2300	275
2	1000	A.C.	M111	2300	240
1	1000	G.E.	MT-452	2300	321
1	500	G.E.	M-574Y	6900	900
1	500	Whase.	CW	550	350
1	450	G.E.	IM	440	720
1	400	Whase.	CW-960A	440	1170
1	400	Whase.	CW	440	514
1	400	Whase.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2300/4000	253
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-453Y	4000	257
1	250	G.E.	MT-5508	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	260B	440	585
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150 (unused)	Whase.	CW	2300	435
1	150	G.E.	IM-16	440	600
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	605

SQUIRREL CAGE

2	450	G.E.	PT-550BY	440	3570
2	450	Whase.	CW-1420	2300/4150	354
1	300	Whase.	CR	440	1170
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150	Whase.	CR-8508	440	880
1	150	Whase.	CR	440	580
1	150/75	G.E.	IK	440000/450	
2	125	Al. Ch.	ARW	2200	1750

SYNCHRONOUS

1	4350	Cr. Wh.	2-01-8L	13800/6000	514
2	3500	G.E.	TR	2300	257
2	2100	G.E.	ATI	2300	260
2	1750	G.E.	ATI	2300	1600
2	2000	Whase.		2300	120
3	735	G.E.	ATI	2200/12000	600
1	500	Ideal	BM	2300/4150	1800
1	500	Whase.		440	900
1	450	Whase.		2200	128.5
1	450	Whase.		2200	450
1	400	G.E.	TR	2200	400

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CLEVELAND Double Cranks, 46-6-72, 46-D-60.
NIAGARA Double Cranks, 67C, 67BX.
BLISS Nos. 4, 22K, and 24K Knuckle Joint Presses.

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MOTORS & GENERATORS, etc. 1 YEAR GUARANTEE

Partial Listing Only!

HP	MAKE	TYPE	SPEED
600	Cr. Wh.	191A	514
2-500	G.E.	IM	450
2-450	G.E.	IRM-17B	900
400	G.E.	IM	600
350	West.	C.W.	450
300	West.	C.W.	1200
300	G.E.	IM-17A	600
200	G.E.	MTP-557	1800
2-200	West.	HF-150	600
150	West.	HF-150	600
125	G.E.	IM-15	400
100	G.E.	MT-947	1200
100	G.E.	IM	720
100	E.D.		514

SQUIRREL CAGE MOTORS

HP	MAKE	TYPE	SPEED
200	Wagner	RP2-265	1800
200	G.E.	RF-2655	900
200	Al. Ch.		900
150	West.	GR	1200
150	El. Machy.		1200
150	Cr. Wh.	SC-55B	1800
150	G.E.	IK-17	600
125	Cr. Wh.	SC-55B	3600
125	Al. Ch.	AR-236	1800
125	G.E.	IK	1200
100	West.	TEFC, CR-407B	3000
100	G.E.	KT-543	1800
100	West.	CR	1800
100	West.	CR	900

LOW & HIGH FREQUENCY A. C. GENERATORS

SIZE	MAKE	CYCLE
10 KW	G.E.	15
10 KW	G.E.	25/40
200 KW	G.E.	25/40
5 KW	G.E.	120
230 KVA	G.E.	150
154 KVA	G.E.	150
15 KW	G.E.	180
25 KW	Fluwell	180
50 KW	G.E.	210
5 KVA	Sterling	300
7 1/2 KW	G.E.	120

DC MOTOR DRIVEN AC GENERATORS

SIZE	MAKE	INPUT VOLTS	OUTPUT VOLTS
50 KVA	Pier	115	120
50 KVA	West.	220	220
81 KVA	Ideal	115	440
81 KVA	El. Machy.	220	440
12 1/2 KVA	Cr. Wh.	220	240
10 KVA	Burke	110	120
7 1/2 KVA	Hertner	115	220
5 KW	G.E.	220	240
5 KVA	El. Spec.	115	110
7 1/2 KVA	Cont.	220	120
2 1/2 KVA	K & R	115	220

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SLIP RING MOTORS

Constant Duty—3 phase 60 cycle

HP	Make	Type	Volts	RPM
1000	G.E.	MT-400	2300	357
1200	G.E.	MT-50	4160/2300	368
1300	G.E.	MT-50	2300	377
700	G.E.	I-M	2300	400
600	G.E.	ANT	2300	414
400	G.E.	I-1A-M	2300	450
300	G.E.	MT-410	2300	460
250	G.E.	I-1A-M	2300	460
250	Whar.	CW-507	440	1300
250	G.E.	MT-410	2300	460
250	G.E.	I-1A-M	2300	450
150	G.E.	ANT	440	730
125	G.E.	MT-507	2300	1300
100	G.E.	I-1A-M	2300	465

SQUIRREL CAGE MOTORS

3 phase 60 cycle

HP	Make	Type	Volts	RPM
1000	G.E.	I-M	2300	357
800	Whar.	CH-800	2300	1750
800	Whar.	CH-875-C	2300	1160
300	Al.-Ch.	AR	440	550
150	Al.-Ch.	AR	2300	1750
125	Al.-Ch.	AR	2300	490
100	Whar.	CH-600	440	1750
100	G.E.	KT-500	440	670
100	Whar.	CH-600	2300	495
75	Al.-Ch.	AR	2300	690

SYNCHRONOUS MOTORS

3 phase 60 cycle

HP	Make	P.F.	Volts	RPM
18000	Whar.	80	4800/5400	720
21000	G.E.	100	2300	880
3000	G.E.	80	2300	730
1700	G.E.	100	2300	8800
750	G.E.	80	2300	450
710	G.E.	80	2300/440	730
600	Ed. Mch.	80	440	1200
500	G.E.	80	440/230	900
350	G.E.	100	2300	514
350	Whar.	80	440	600
300	Whar.	80	440	1200
187	G.E.	80	440	730
150	G.E.	80	2300	800
150	G.E.	100	550	600
125	G.E.	80	4000/2300	1200
125	Ed. Mch.	100	4800/2400	800
100	Whar.	80	440	1800
100	G.E.	80	440	600

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Westinghouse 200 KW 230 KVA—440/3/60—1200 RPM—80% P.F.—continuous—drip-proof enclosure—direct connected exciter.

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Each unit, mounted on a pre-fab sub-base, is 15' 9 1/2" long, 8' 10 1/2" wide, approx. 9' high. Weight of engine and generator only, 17,700 lbs. Each unit, with all accessories, about 27,000 lbs.

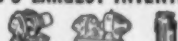
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1 inch	\$ 12.25	\$ 11.55	\$ 10.95	\$ 10.20	\$ 9.60	\$ 9.00
2 inches	23.75	21.90	20.40	19.20	18.00	17.20
3 inches	34.55	32.85	30.60	27.00	27.00	26.00
4 inches	46.10	40.80	38.40	36.00	34.55	32.65
5 inches	57.60	51.00	45.00	45.00	43.20	40.80
6 inches	65.50	61.20	54.00	54.00	51.85	48.95
8 inches	87.35	76.80	72.00	69.15	65.50	60.85
10 inches	110.00	90.00	90.00	86.35	82.00	76.00
15 inches	153.00	135.00	129.50	122.50	114.00	108.00
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30 ton Industrial Brownhoist Gas Loco-
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Cheap.

25 ton Orton Diesel Locomotive Crane.
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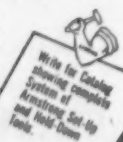
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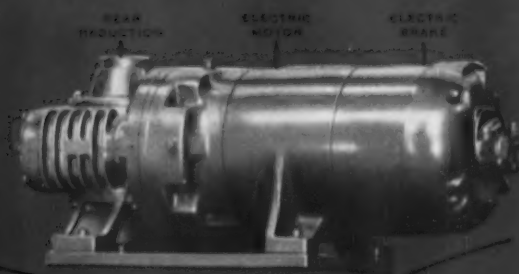
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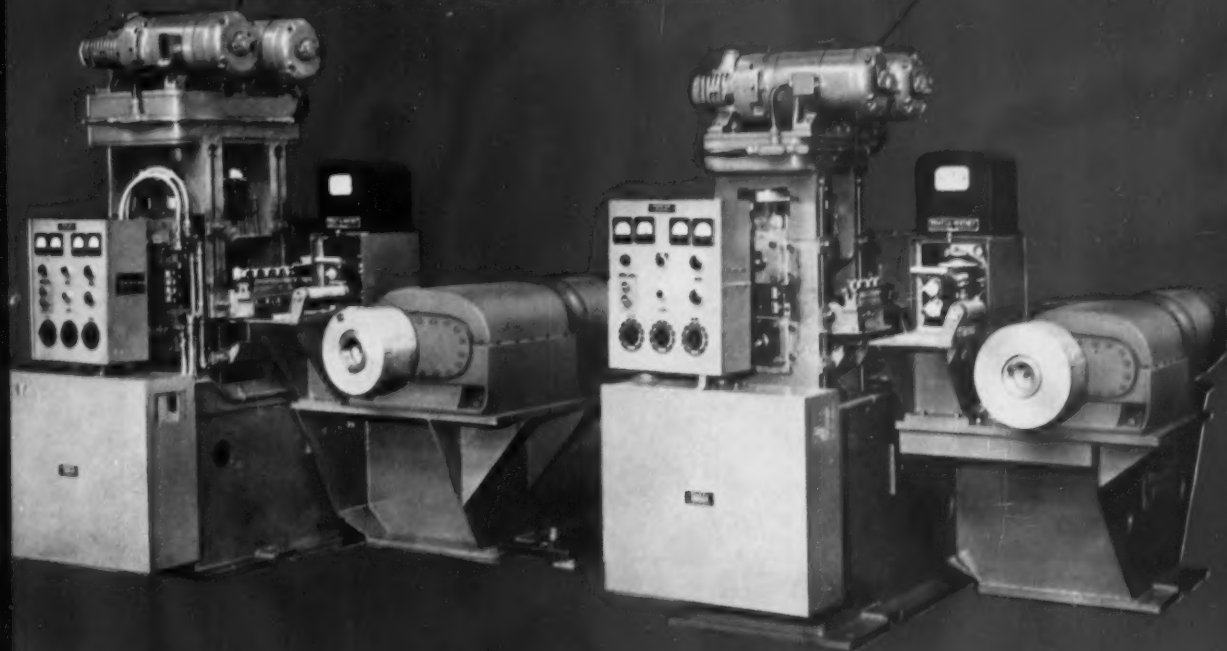


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